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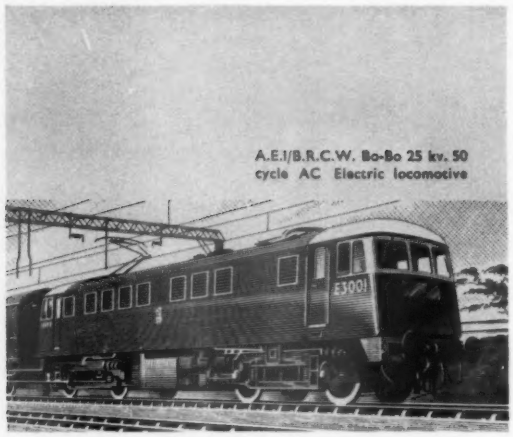
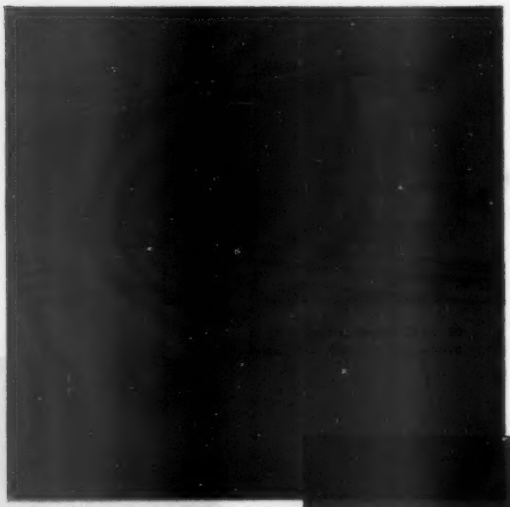
Without the need for dismantling, the entire axle-box with its Timken bearings is fitted in a few minutes.
The interference fit—safeguarded by the toughened shock-resistant core of the high nickel-alloy case-hardened steel—is carried out with an ordinary press, with simple equipment (shown in silver) without the need of heating, and has proved ideal.
British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.
TIMKEN®
REGISTERED TRADE-MARK
tapered roller bearings


A.E.I/B.R.C.W. Bo-Bo 25 kv. 50 cycle AC Electric locomotive

SKF

in British Railways main line electrification

Illustrated here are four types of main line electric locomotive built under British Railways Modernisation Plan. SKF spherical roller bearing axleboxes have been specified for each, thus ensuring the smoothness and absolute reliability demanded by intensive traffic conditions.



B.R. Southern Region Bo-Bo 2500 h.p. 750v. DC Electric locomotive

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OVER 1,300,000 SKF ROLLER BEARING AXLEBOXES HAVE NOW BEEN SUPPLIED TO THE RAILWAYS OF THE WORLD

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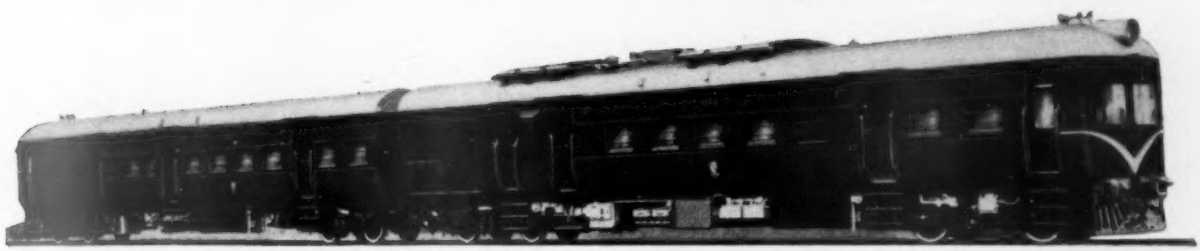
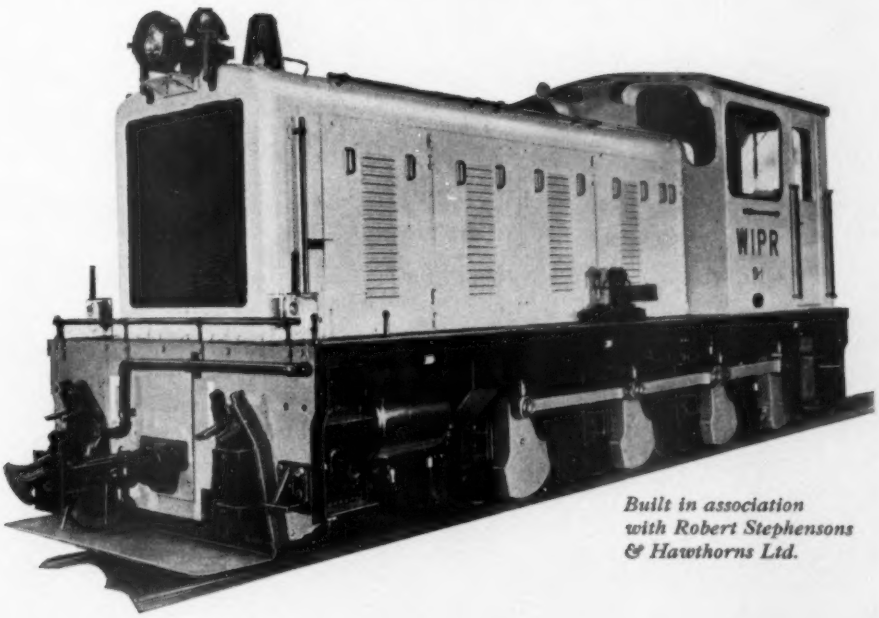


Built in association with
The Birmingham Railway Carriage
& Wagon Co. Ltd.

WITH MECHANICAL OR HYDRO-MECHANICAL TRANSMISSION

The upper illustration shows one of two Twin Car Units shipped this year to the Nigerian Railway Corporation, equipped with twin underfloor engines totalling 400 h.p. and multiple-speed epicyclic transmission with automatic control. The lower illustration is one of a number of 30-ton metre gauge Drewry locomotives recently shipped to Portuguese India, for freight and passenger duties.

AND LOCOMOTIVES



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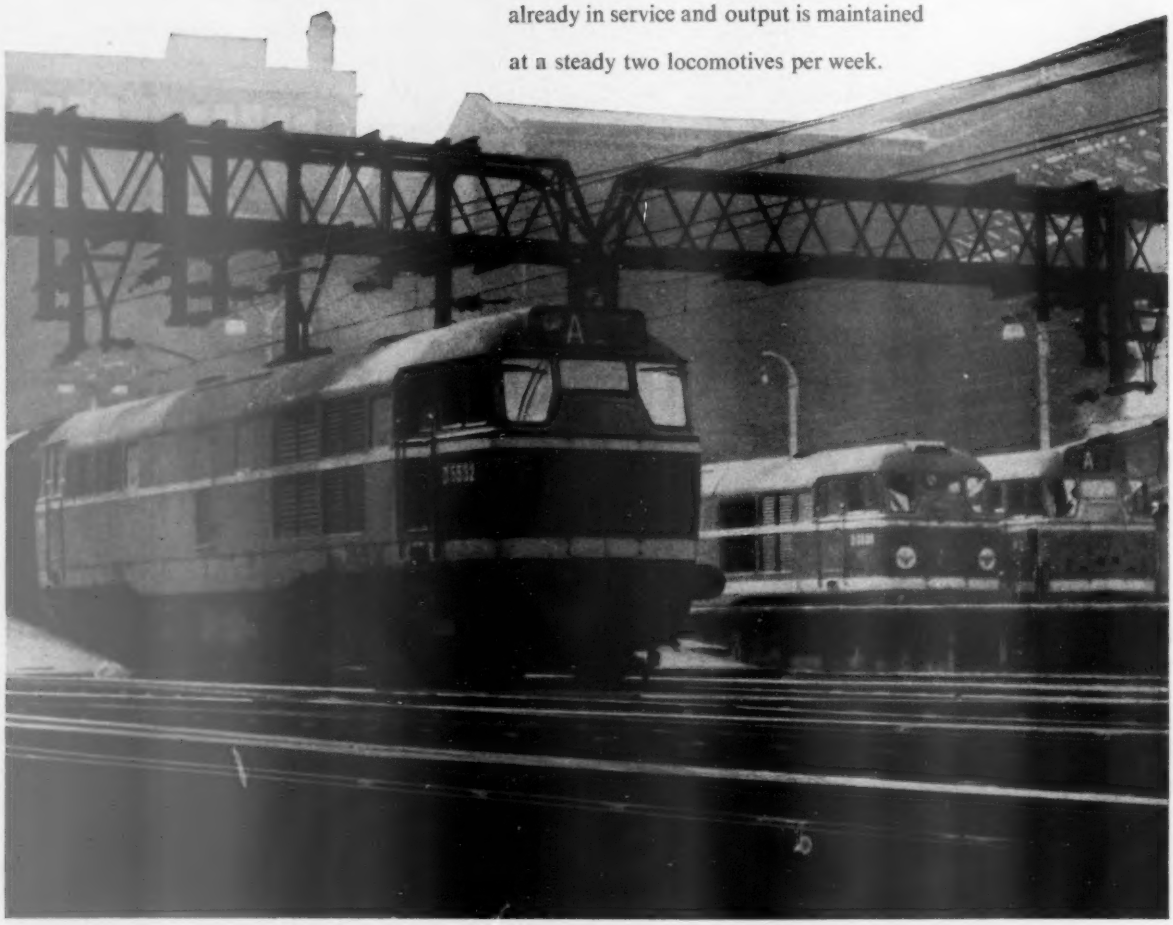
TWO HUNDRED
AND TWENTY SIX
LOCOMOTIVES FOR BRITISH RAILWAYS

226 Brush Type-2, 1250–1365–1600 H.P. Diesel Electric Locomotives have been ordered for British Railways, over half of these are already in service and output is maintained at a steady two locomotives per week.



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BRITISH RAILWAYS ACHIEVE THE OPTIMUM IN ECONOMICAL HANDLING WITH COLES

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Records show that for an 8 hour shift—during which a maximum scrap throughput of 100 tons has been achieved—fuel consumption has averaged only 2¼ gallons.

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698

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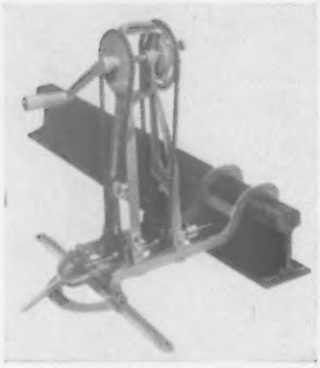
MADE IN ENGLAND

DRILLING MACHINES for SIGNAL ENGINEERS

1 SINGLE SPINDLE MACHINE
2 TWIN SPINDLE MACHINE
3 TRIPLE SPINDLE MACHINE

FOR DRILLING TRACK CIRCUIT BOND WIRE HOLES



ABTUS HAND OPERATED BOND DRILLING MACHINE— SINGLE SPINDLE

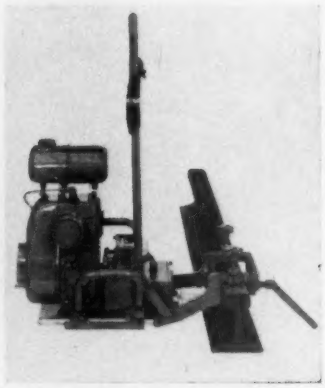
★ DRILLS $\frac{9}{32}$" or $\frac{3}{8}$" DIA. BOND WIRE HOLES IN ONE MINUTE

★ AN INSTANTANEOUS RAIL CLAMPING DEVICE ENABLES THE MACHINE TO BE EASILY REMOVED FOR THE PASSAGE OF TRAINS

★ WEIGHS ONLY 32-lb.

ABTUS POWER BOND DRILLING MACHINE TWIN SPINDLE

OVERSEAS MODEL. Fitted with height adjustment rail clamp.



★ DRILLS TWO $\frac{9}{32}$" or $\frac{3}{8}$" DIA. HOLES SIMULTANEOUSLY IN 25-30 SECONDS.

★ POWERED BY $1\frac{1}{4}$" H.P. JAP PETROL ENGINE.

★ MACHINE INCORPORATES POWER TAKE-OFF FOR FLEXIBLE DRIVE UNITS AS FOLLOWS:
(a) UNIT FOR DRILLING SINGLE $\frac{9}{32}$" OR $\frac{3}{8}$" DIA. HOLES IN P & C LAYOUTS.
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THE TRIPLE SPINDLE

MACHINE WITH THE SAME FEATURES DRILLS THREE $\frac{9}{32}$" OR $\frac{3}{8}$" DIA. HOLES SIMULTANEOUSLY

FOR EASY TRANSIT A TWO WHEEL DETACHABLE UNDERCARRIAGE CAN BE SUPPLIED WITH MACHINE

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✳ INCREASED PITCH ACCURACY
✳ REDUCED HANDLING TIMES
ON

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PRECISION LATHES
WHEN

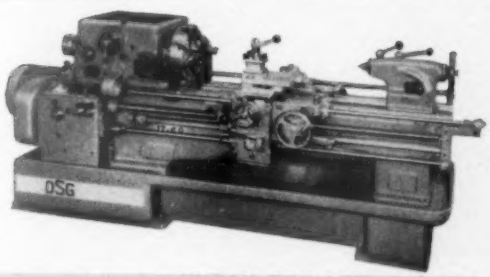
MULTI-START & COARSE PITCH THREADING

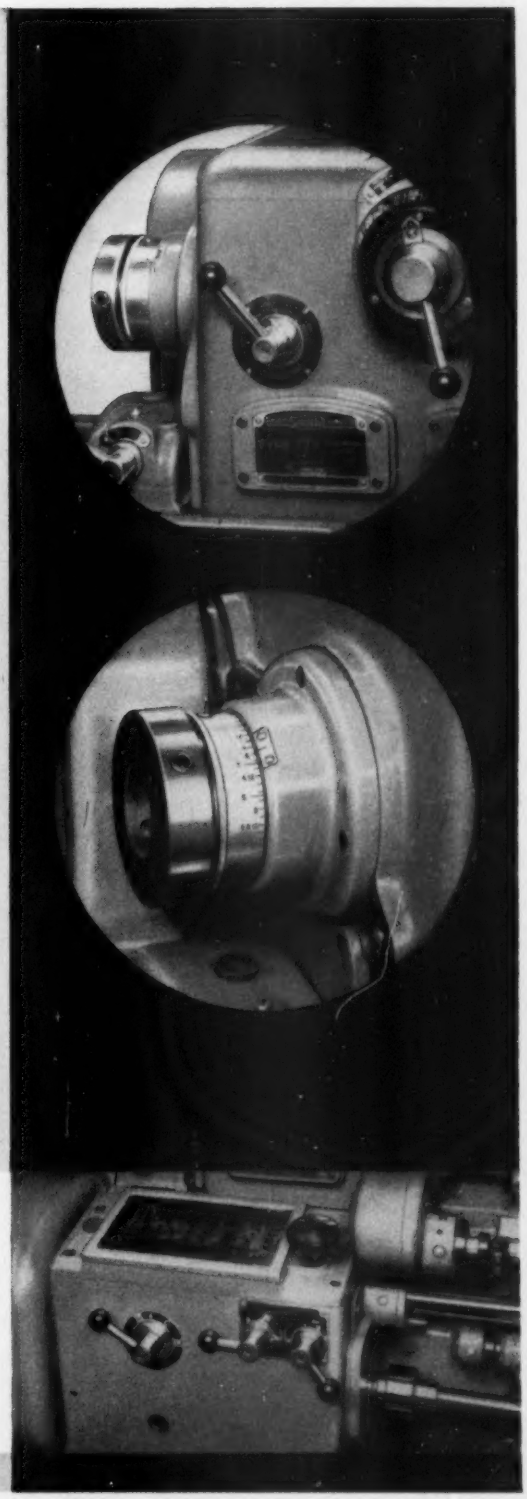
Each size of lathe in the D.S.G. range incorporates a totally enclosed screwcutting Gearbox, providing the means for rapidly selecting thread pitches.

The Headstock is fitted with a feed increasing device for coarse pitch threading.

The lathe spindle is fitted with an indexing dial which indicates the precision indexing obtained from a ground divider in the Headstock. This dial is standard equipment on TYPES 13-1 and 17 Toolroom lathes.

WHEN MULTI-START AND COARSE PITCH THREADING, THE COMBINATION OF THESE FEATURES ENSURES THAT ALL THE ABOVE ADVANTAGES ARE OBTAINED.





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Manufacturers of
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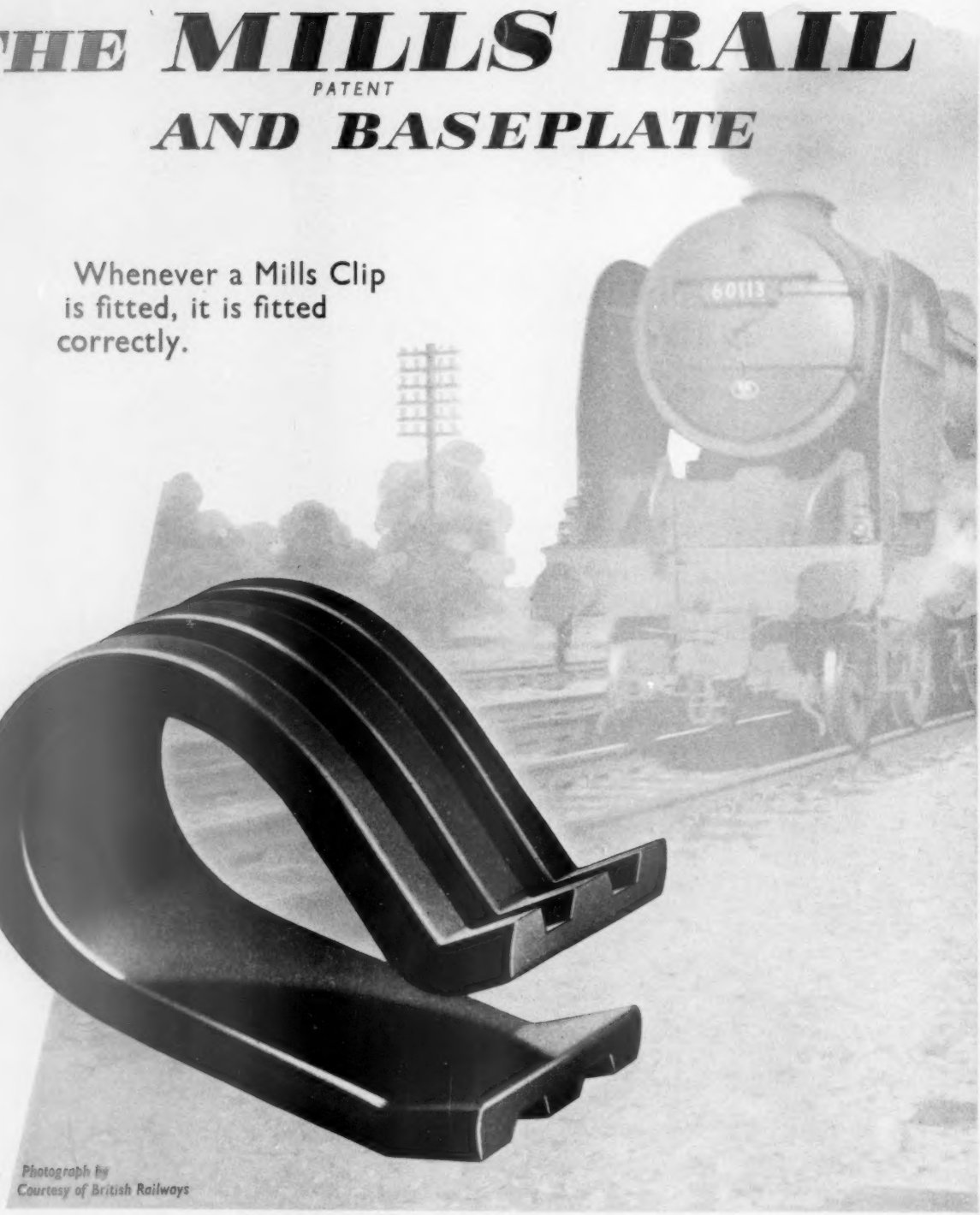
PATENT
AND BASEPLATE

Whenever a Mills Clip is fitted, it is fitted correctly.



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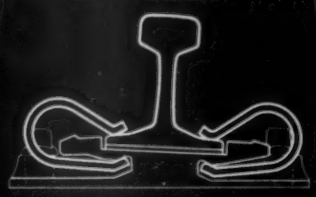
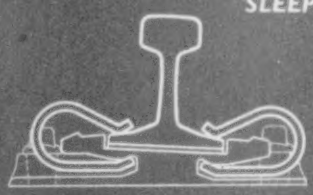
CLIP

FOR WOOD SLEEPERS



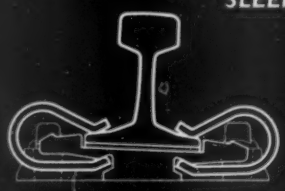
Four-hole baseplate with or without rubber rail pad.

FOR 'E' TYPE CONCRETE SLEEPERS



Two-hole baseplate, interchangeable with CSI Bullhead Chair.

FOR 'F' TYPE CONCRETE SLEEPERS



Small Area two-hole baseplate for main line use.

Every Mills Clip fitted applies a uniform load to the rail within a known range.

Very suitable for long welded rails and all heavy duty track

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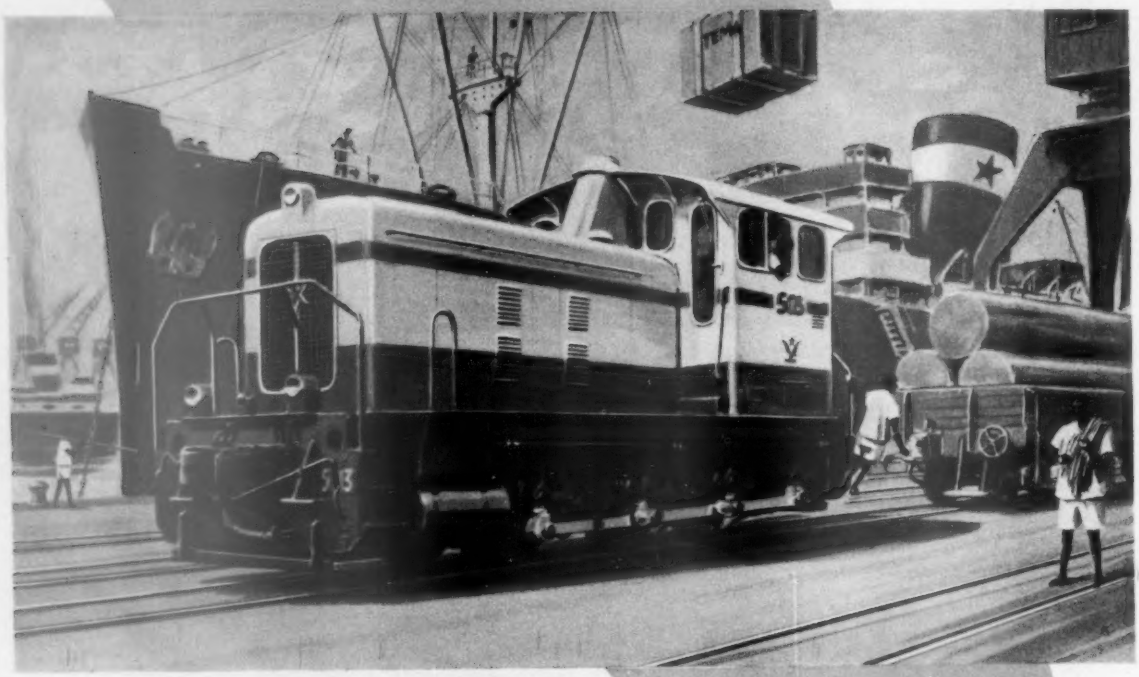
HENSCHEL



Diesel Hydraulic 40-ton Shunter 410 H. P.

One of the most economic applications of diesel motive power is in shunting operations. Consequently the Ghana Railway & Harbours Authority has decided to employ only diesel locomotives HENSCHEL LOCOMOTIVES in the extensive yards of the new Tema Harbour. Six of them will do the whole job efficiently.

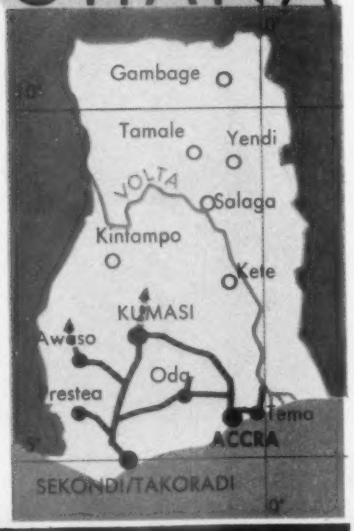
Locomotive Production Range:

diesel-hydraulic locomotives 120 to 4,000 H. P.

diesel-electric locomotives 950 to 2,000 H. P.
(GENERAL MOTORS License)

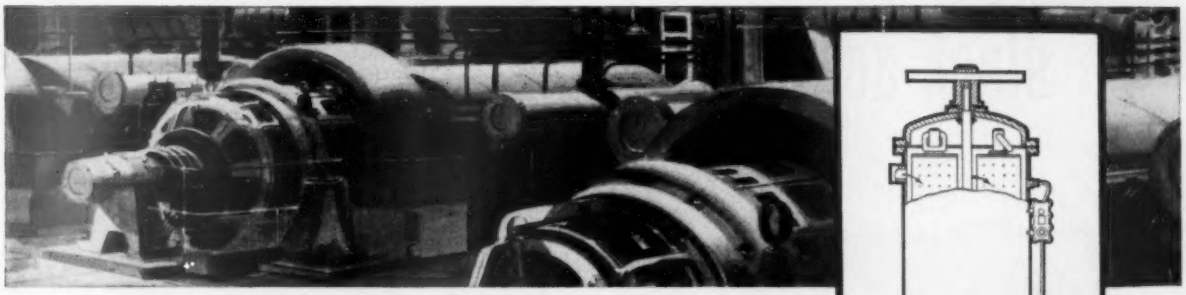
electric locomotives for all track gauges

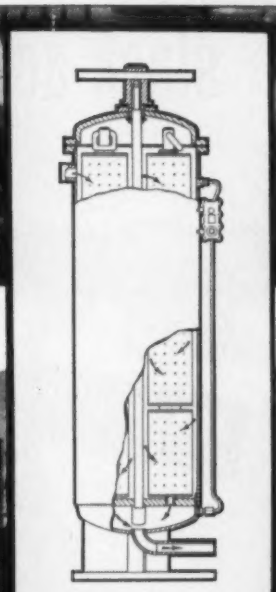
GHANA



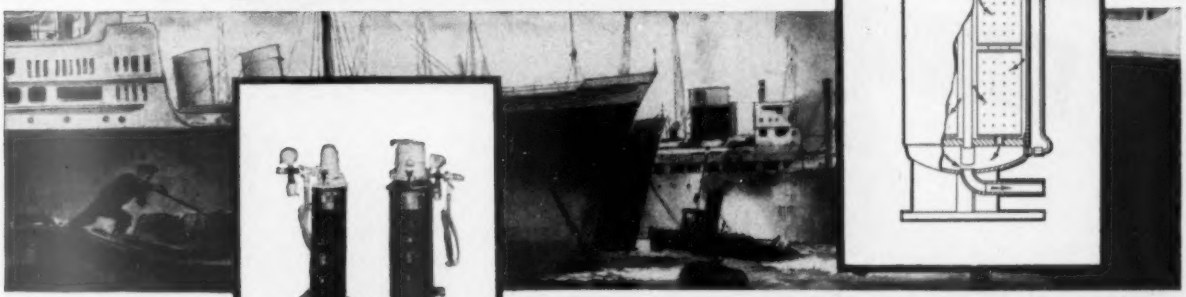
HENSCHEL-WERKE GMBH KASSEL GERMANY

STREAM-LINE FILTERS

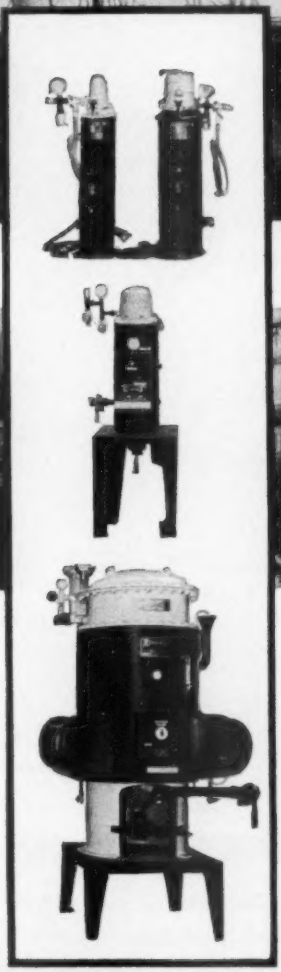


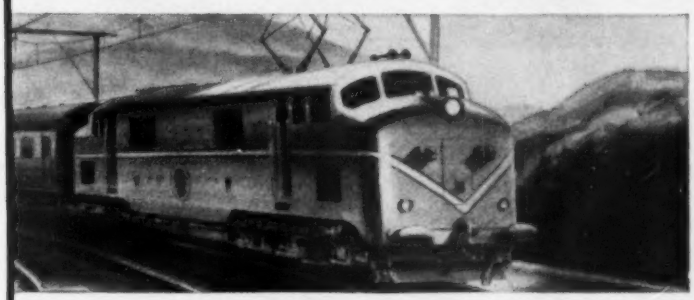


for the purification of



engine lubricating oil





Illustrated right is a selection from the standard range of pressure operated edge-type filters.

A complete range of Stream-Line *by-pass* filters is now available for the filtration of lubricating oil supplied to large stationary diesel engines, locos, marine engines etc. The edge type filter for straight mineral oil uses the well-known Stream-Line principle of special paper discs spring-compressed on rods to remove the ultra-fine peptised carbonaceous matter which tends to impair the efficiency of a *full-flow* filter; the new Micro-Pak, for detergent oil, has an element comprising low cost, expendable cartridges of lintless, acid resistant, cellulose material. This gives the best efficiency that can be associated with a sustained, adequate flow rate, together with high capacity for retained solids and, therefore, long cartridge life.

Please write for full details of how these economical, easily serviced filters can help extend the life of your lubricating oil—and your engine and its full-flow filter.

The Micro-Pak is available in a range of capacities with centre-bolt (illustrated above) or multi-bolt head, and in either heated or unheated versions.

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STREAM-LINE FILTERS LIMITED

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GRESHAM'S slack adjusters

heavy loco type

Photo by courtesy of Metropolitan-Vickers and South African Railways

medium loco type

Photo by courtesy of N.B. Loco Co. Glasgow and British Railways

carriage & wagon type

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Original designers and patentees.

Manufactured throughout at our Salford Works.

Our technical staff will be pleased to give advice on the design of suitable brake rigging to make the best use of automatic slack adjustment.

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THOUSANDS of trains every year run more smoothly on WALKER'S RAIL PADS

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Appreciating the tremendous punishment meted out to the permanent way Walker's, in close co-operation with Permanent Way Engineers, have pioneered and developed a range of special Bonded Cork Pads for concrete sleepers, longitudinal bridge timbers, points and crossings, high speed curves, diesel pit installations, bridge bearers, electric signal insulation, etc.

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For F.B. rail on baseplates or sleepers

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For use between baseplates or chairs, and softwood sleepers

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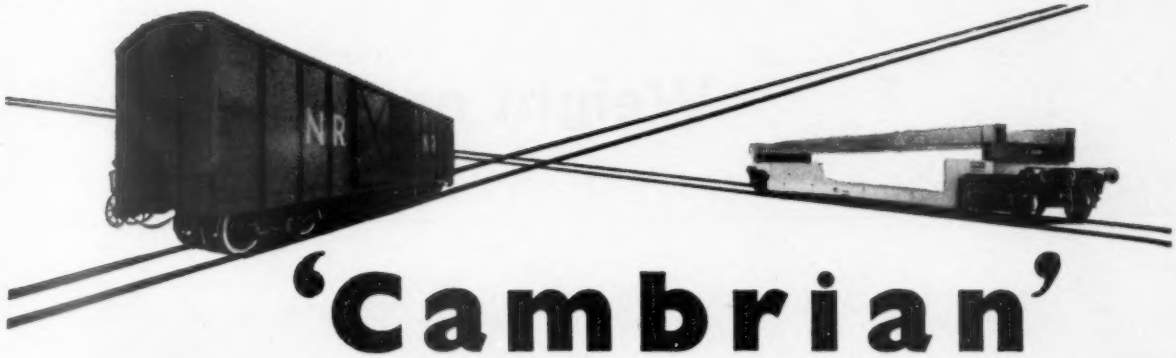
DEPOTS THROUGHOUT THE WORLD

TIB.363



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Steel, Aluminium and Timber Wagons of all descriptions and capacities for home and overseas railways.

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MAR 291

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RAILWAY SIGNALLING

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with SIEMENS all-relay interlocking and CTC installations.

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are the answer to your demand for an optimum of
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SIEMENS signalling equipment has continuously proved its reliability under the most adverse climatic conditions throughout the world.

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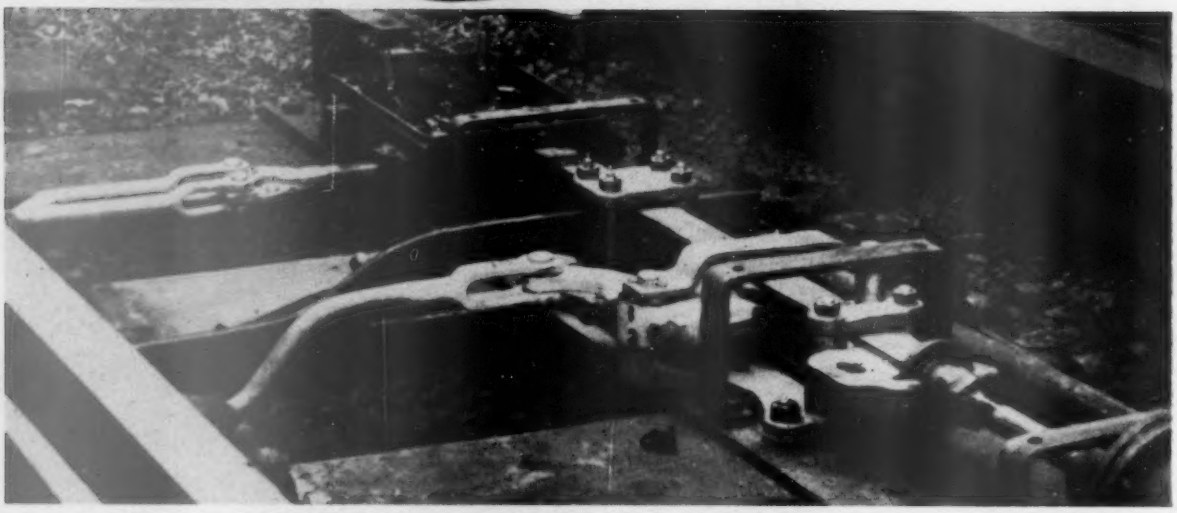


gives 20 times the life

–without lubrication!

ABOVE: Standard lubricated assembly with ⅜" dia. mild steel pin and hardened steel bushes, after three months operation.

BELOW: Anodised aluminium alloy pin ⅜" dia. from Glacier dry bearing assembly after three months operation. Dark area on pin is P.T.F.E. lead substance and indicates satisfactory operation.

This remarkable result from a long series of rigorous tests on Glacier DU dry bearings and bushes makes possible tremendous savings in material and maintenance costs.

The testing ground was a busy junction at Euston Station. DU dry bushes, running unlubricated against anodised aluminium pins, were used in the assemblies of point mechanisms that operated 300 times a day. After several months, including spells of very severe weather, inspection showed no measurable signs of wear. Operating life was estimated at twenty times that of conventional bushes and pins.

Glacier DU has these very considerable advantages.

Fretting corrosion, the principal cause of wear in such cases, is completely eliminated. With DU it CANNOT OCCUR. Extreme weather conditions do not affect DU bearings, and lubrication is never necessary.

**Glacier DU dry bearings are composed of steel strip to which is sintered a layer of porous bronze impregnated with a mixture of a fluoro-carbon plastic (P.T.F.E.) and lead.*

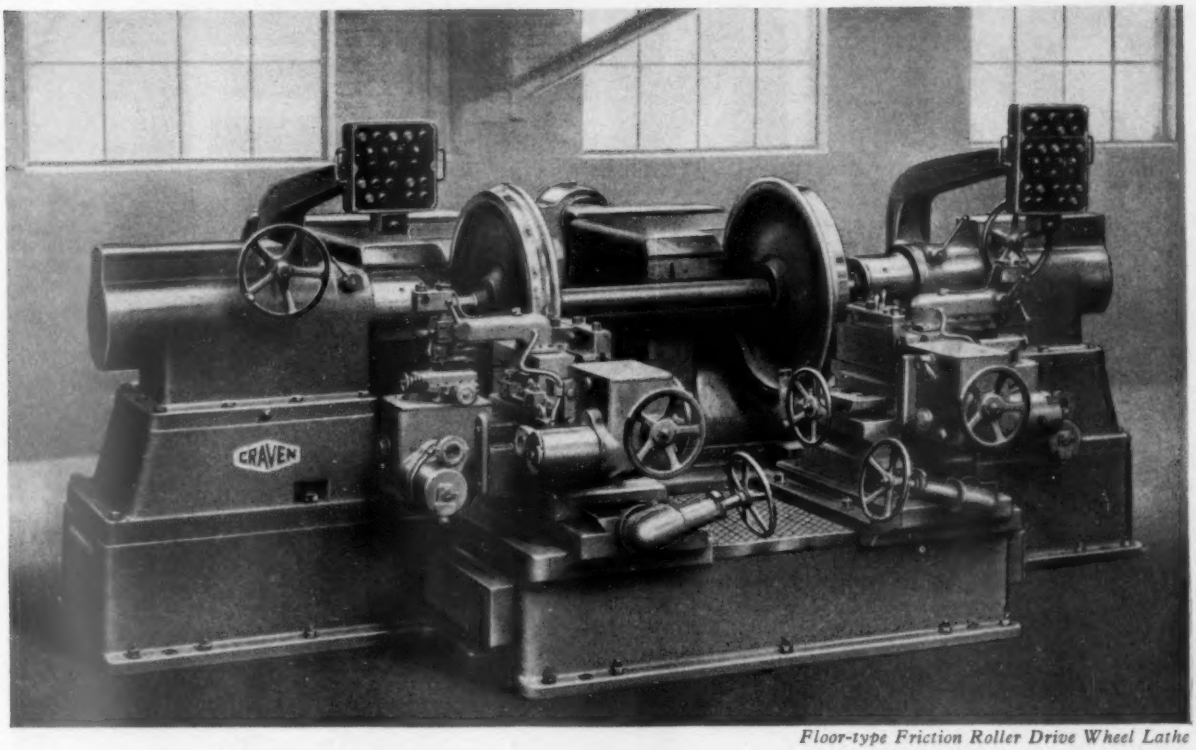
Glacier DU dry bearings and bushes have also been tested and proven in these varied applications:- for detector boxes, train stops, upper quadrant assemblies, brake mechanism assemblies, bolster swing link assemblies and locomotive LT tap changer mechanisms, thrust screw adjustment assemblies and motor bogie axle boxes.

GLACIER

For details of the range and properties of Glacier dry bearings, write for a free copy of the Designer's Handbook No. 2. to:-

THE GLACIER METAL COMPANY LTD.

ALPERTON · WEMBLEY · MIDDLESEX



Floor-type Friction Roller Drive Wheel Lathe

FLOOR-TYPE AND PIT-TYPE

WHEEL LATHES

WITH FRICTION ROLLER DRIVE AND ELECTRICAL PROFILING

Recent developments in Craven Railway Wheel Lathes utilise carbide tools for re-turning diesel and electric traction wheels. The floor-type lathe deals with dismantled wheel sets, either with or without their axleboxes in position: the pit-type lathe re-turns wheel sets in position on the vehicle. The drive is by two pairs of hydraulically-loaded friction rollers—one pair to each wheel—giving a balanced, self-contained thrust upon the wheel rims to transmit a high driving torque without risk of distortion. Tread and flange form profiling is by Craven patent fully-automatic, single-point electrical profile copying equipment.

Patent Nos. 849291 & 833326,
and application No. 29749/59.

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MACHINE TOOLS

CRAVEN BROTHERS (MANCHESTER) LTD

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CMT 18

DANGER

Skate on the thinnest ice: step on the conductor rail: cross Piccadilly Circus from Northwest to Southeast: but remember that **ASSOCIATED LEAD** are the most reliable and economical suppliers of **RED LEAD PAINTS & 'RUSTODIAN' CALCIUM PLUMBATE PAINTS.** The dangers involved in forgetting this simple fact are too numerous to name: but, to put it shortly, it is a matter of profit and loss.

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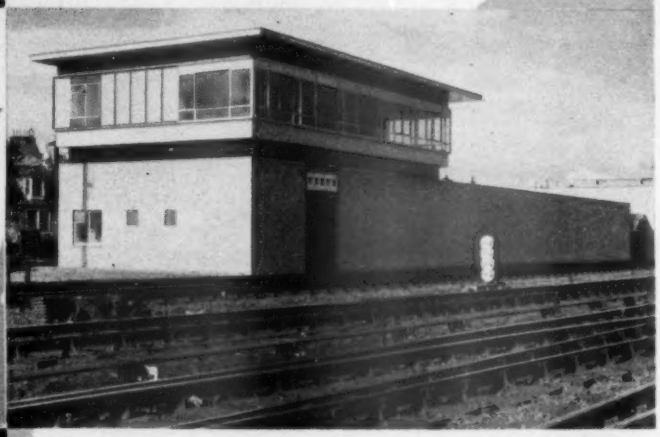

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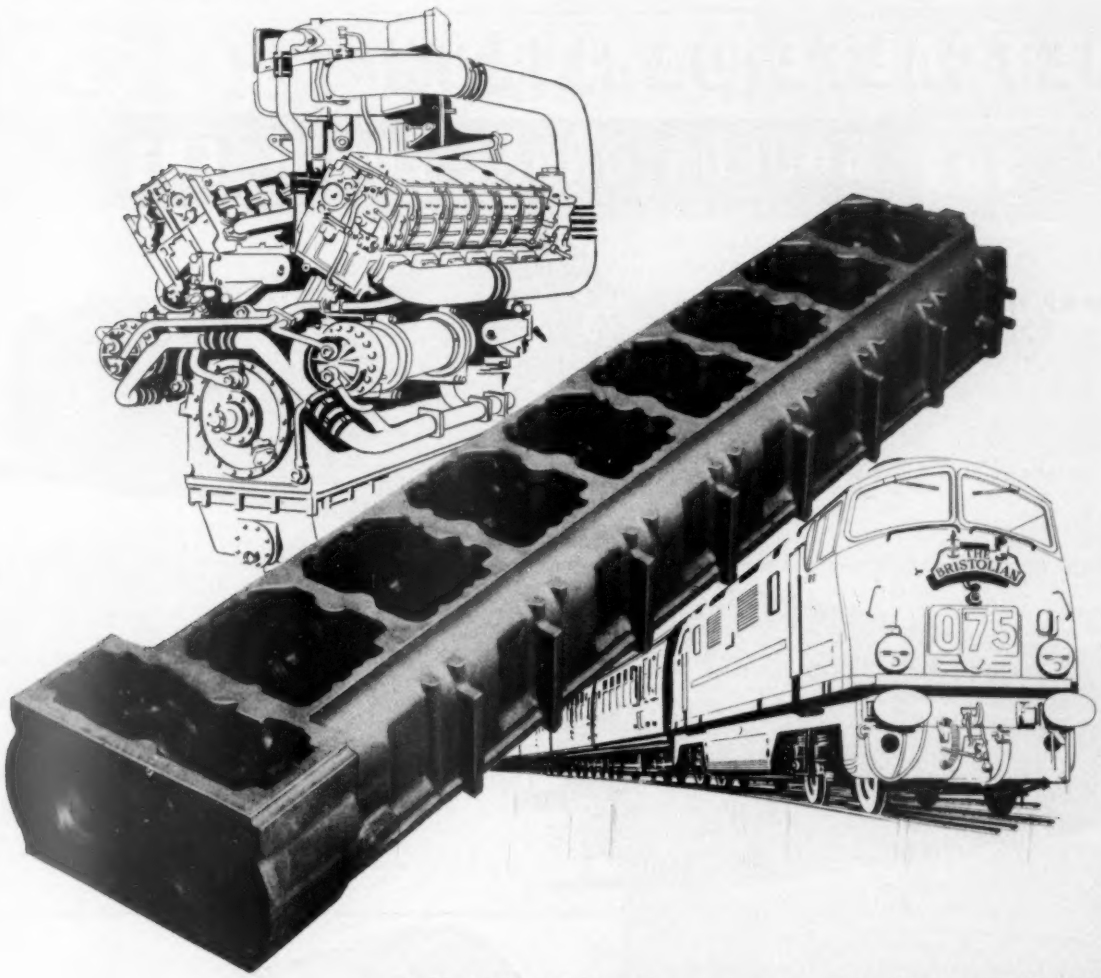

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MODERN BRAKE EQUIPMENT

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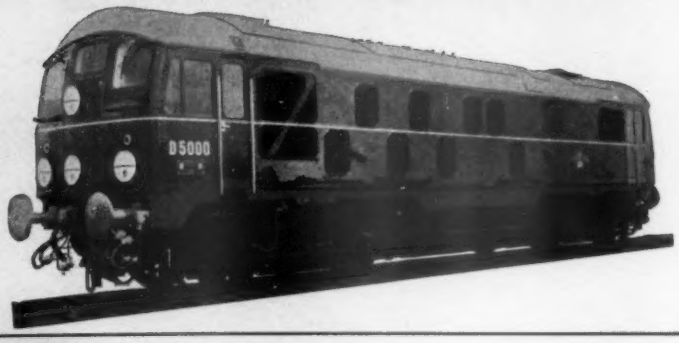
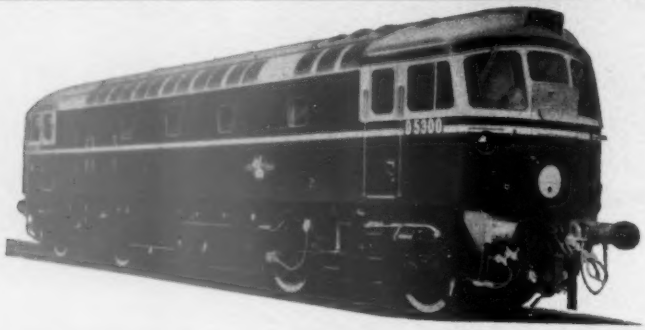




1160 H.P. Type '2' Diesel-Electric Locomotives.

Built by the Birmingham Railway Company & Wagon Co. Limited.

47 of these locomotives have Sulzer Engines and Crompton Parkinson Power Equipment.

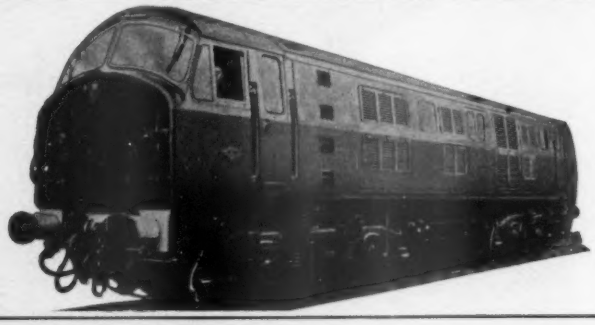
Metcalfe-Oerlikon brakes are also fitted.

1100 H.P. Type '2' Diesel-Electric Locomotives.

Built by the North British Locomotive Company Ltd.

They have N.B.L./M.A.N. Diesel Engines and General Electric Company Power Equipment.

Metcalfe-Oerlikon brakes are also fitted to 38 of these.



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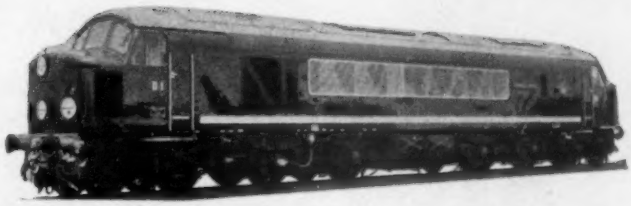
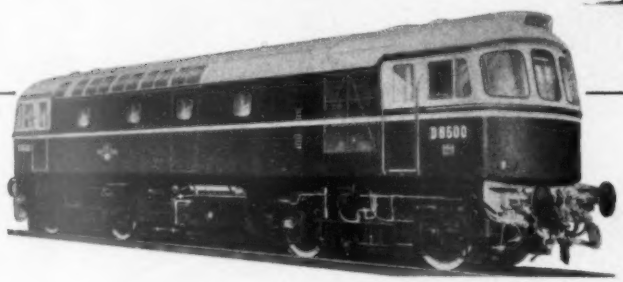
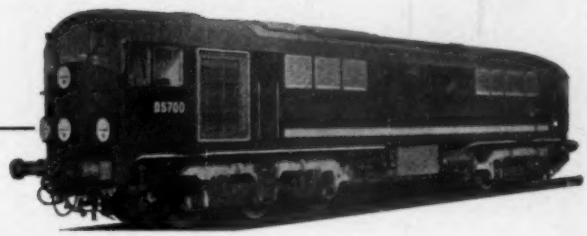
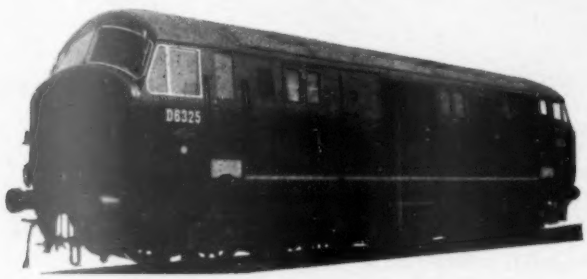




1550 H.P. Type '3' Diesel-Electric Locomotives. Built by the Birmingham Railway Carriage & Wagon Co., Ltd. and fitted with Sulzer Engines and Crompton Parkinson Electrical Equipment. **98** of these Locomotives are to be supplied, and these are arranged for working with either 'Vacuum' or 'Air' braked trains through a single Driver's Brake Valve.

20 – 1200 H.P. Type '2' Diesel-Electric Locomotives. Built by Associated Electrical Industries Ltd. and fitted with Crossley Brothers Ltd. engines. These Locomotives are now in service on British Railways.





52 – 1100 H.P. Type '2' Diesel-Hydraulic Locomotives being built by the North British Locomotive Co., Ltd. with N.B.L./M.A.N. Engines and Voith/North British Hydraulic Transmission.

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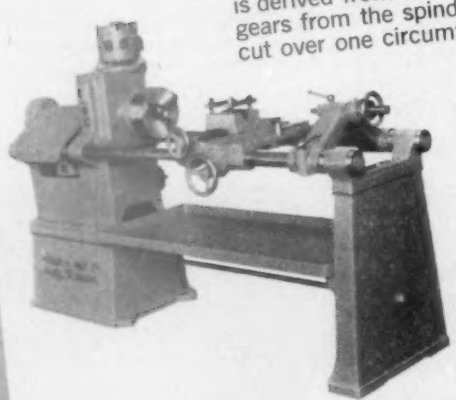

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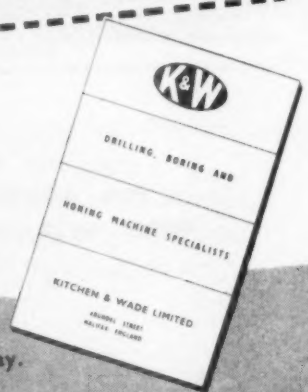

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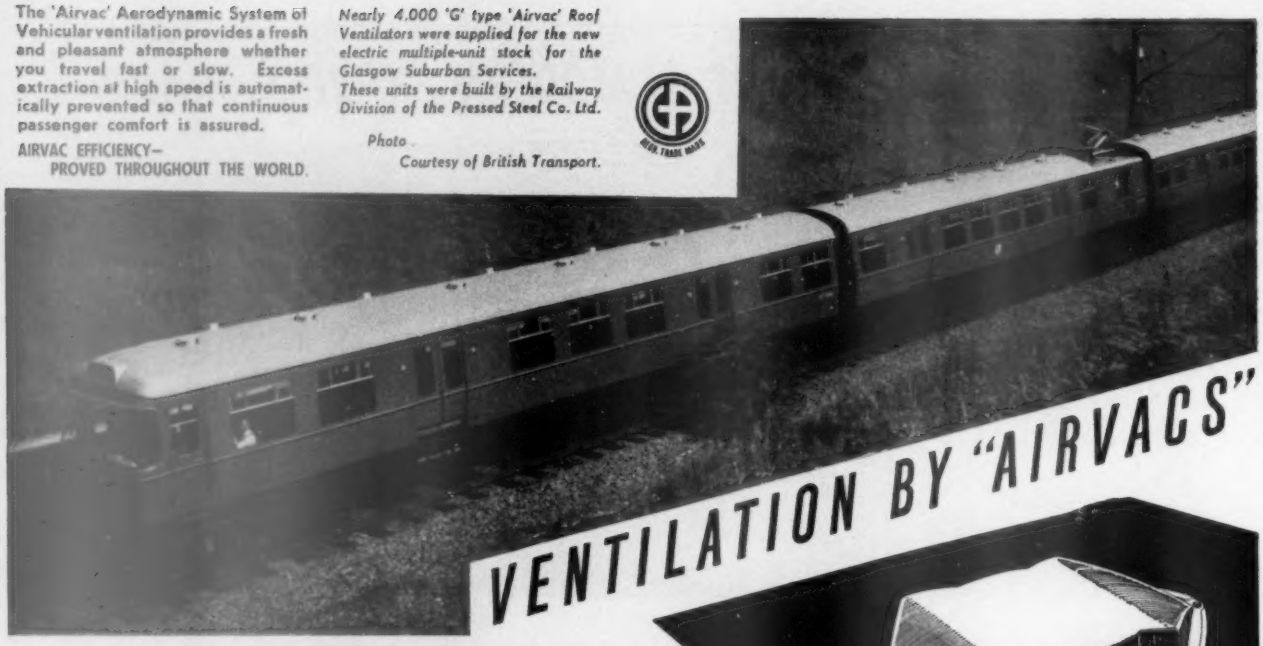

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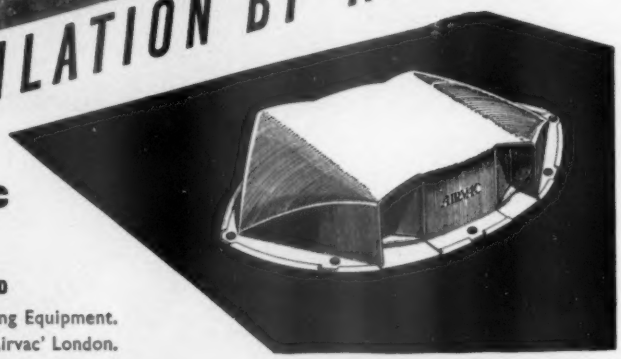

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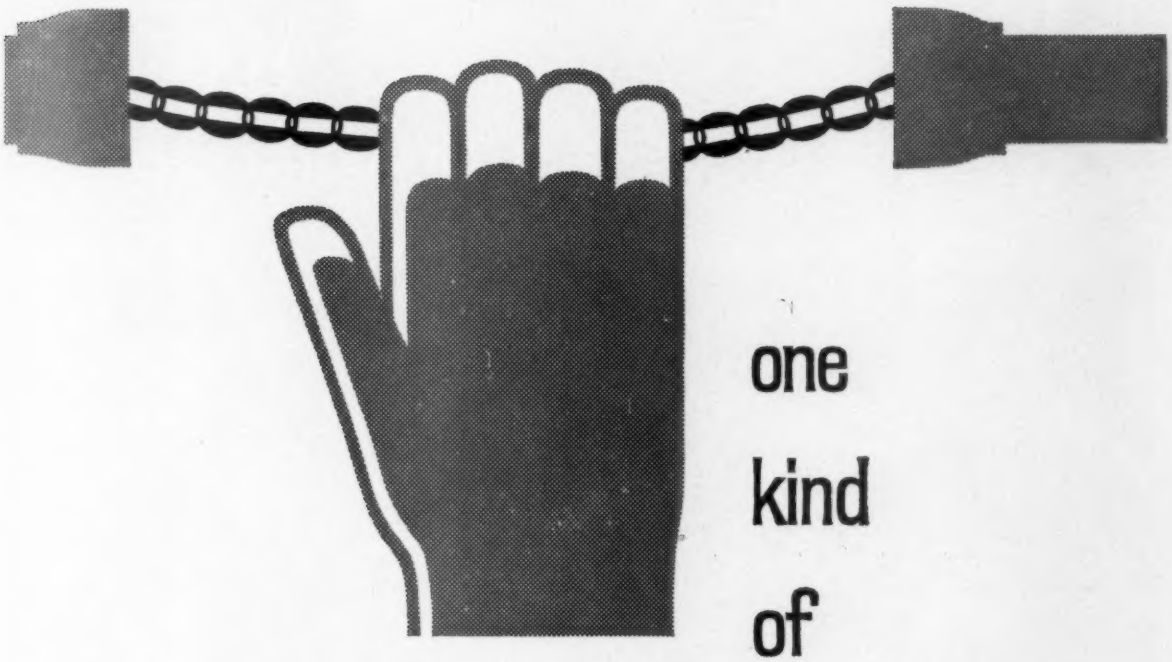

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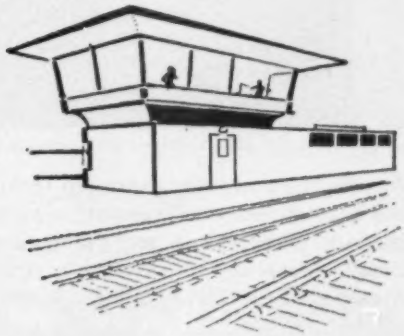

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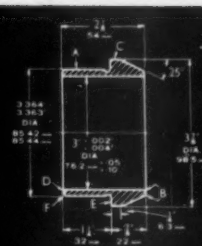

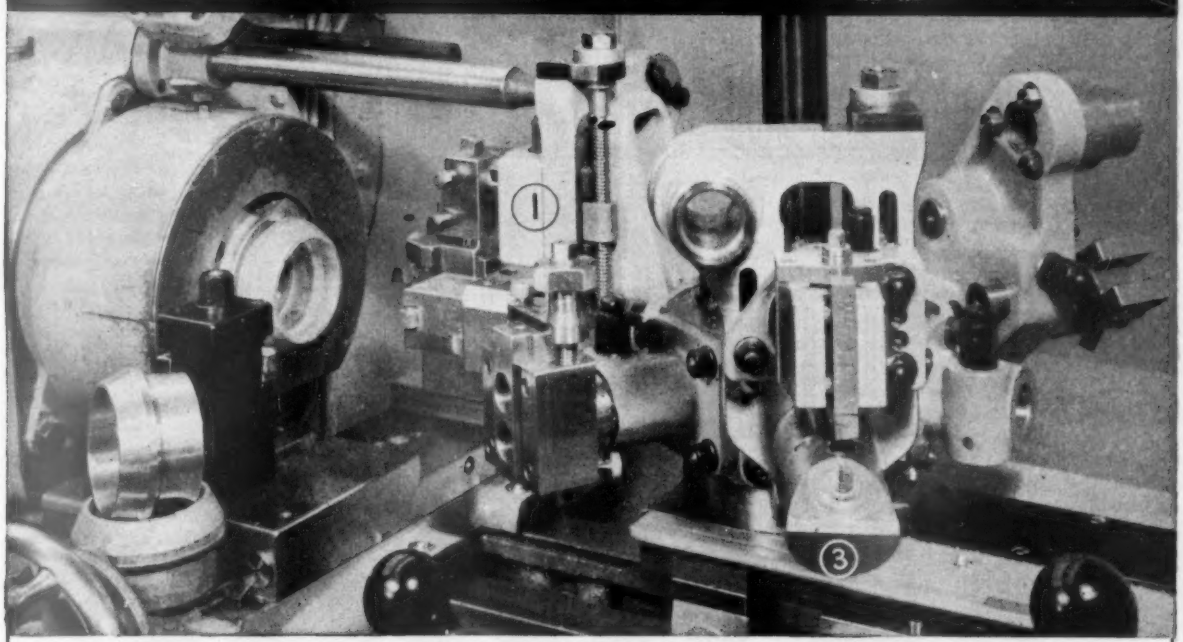

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Turn 25° taper	—	Rear	—	—	—	—	—
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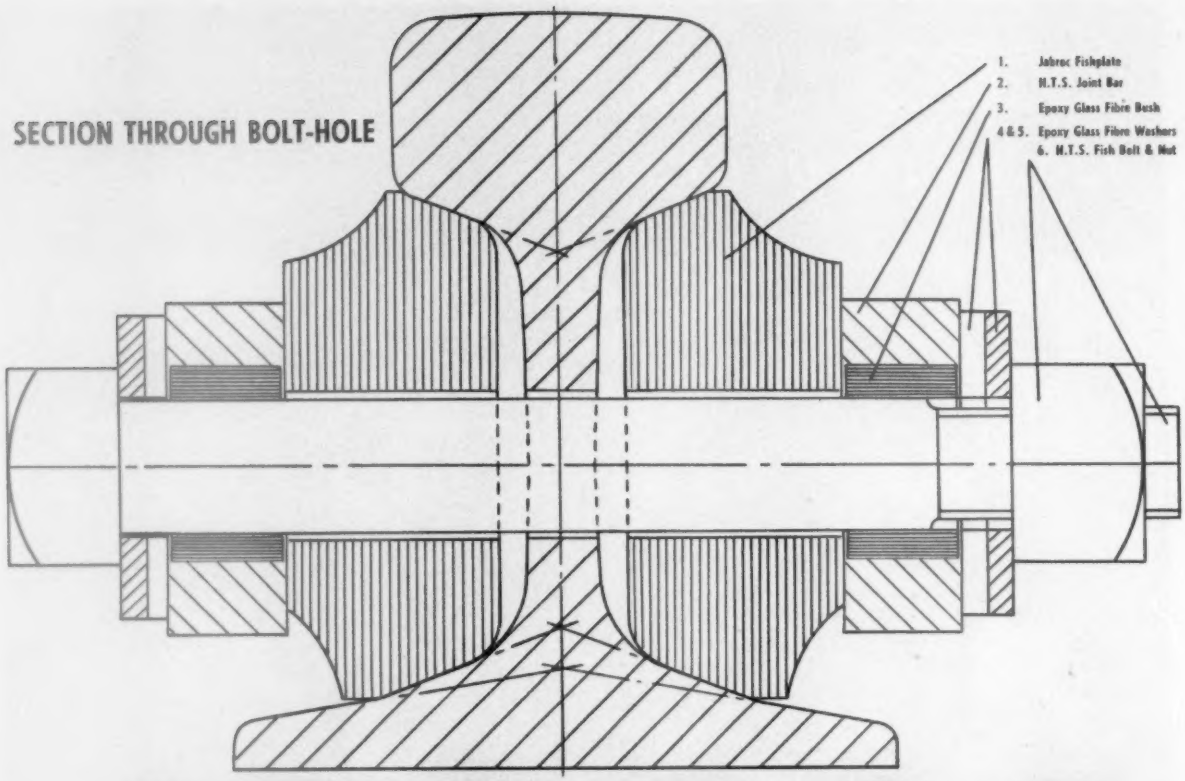
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A journal of Management, Engineering and Operation

VOL 114 FRIDAY FEBRUARY 3 1961 No. 5

CONTENTS

	PAGE
Editorial Notes	121
Reorganisation on Rhodesia Railways	122
Successful C.I.E. drive for Traffic	123
Explaining work study	123
U.N. Railways statistics for 1959	124
Architecture on railways	125
Rate considerations	126
A.A.R. Report for 1960	126
Letters to the Editor	127
The Scrap Heap	129
Overseas Railway Affairs	130
Russian 3,000-h.p. Diesel-Electric Locomotive	131
New Power Signal box for North East Main Line	133
Demolition of Stone Arch Overbridge in the Western Region	134
Christchurch Station Reconstruction	135
British Railways Type "4" Diesel Hydraulic Locomotives	138
Personal	139
New Equipment and Processes	141
News Articles	142
Contracts and Tenders	145
Notes and News	146
Railway Stock Market and Official Notices	148

Editor: B. W. C. Cooke, Assoc. Inst. T.

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The Railway Debate

SPEAKING in the House last Monday, Mr. Ernest Marples, the Minister of Transport, said that, after taking into account certain non-recurring items, the Government's provision for the British Transport Commission during 1961 represented a reduction of £13 million in the railways' operating loss. He hoped the House would take this as an earnest of what was to come. Of the overall transport deficit—about £2,000 million—some £106,000 million was attributable to the railways. Of this sum, £400 million would be written off as a bad debt, £800 million would be transferred to suspense account, and the remaining £400 million was a capital liability. The Crewe-Manchester electrification was to go forward, though it would not be completed until 1964—two years later than had originally been planned—because, for the first time, it had been decided to include the reconstruction of Euston Station in the project. A scheme submitted by the Commission for supplementing certain railway pensions had been approved, although it was pointed out that the cost of this must rest with the Commission and not with the Government. The total additional cost in the first full year of the scheme's operation was expected to be £650,000. Despite the Minister's hints of greater bounty to come, and the assurance of his Joint Parliamentary Secretary, Mr. John Hay, that Mr. Marples "is not anti-railway," members retained a general sense of disturbance with the White Paper. This is not surprising, for the debate did not shed much more light on what it intends to do, and the House was plainly critical of the vagueness of this document. Hard on the heels of the announcement in the House regarding the Crewe electrification, a statement was issued by the British Transport Commission. This was to the effect that the Commission, the London Midland Area Board, and the Region welcomed the decision. Within the framework of the Minister's statement, the Region would go ahead with the work.

Railway Superannuitants

WITH the Minister of Transport's approval, the British Transport Commission has decided to grant additional supplements to the pensions of over 20,000 railway superannuitants at an additional cost to the Commission in the first full year of some £650,000. Supplements to the pensions of certain railway superannuitants were given in 1953, 1955, and 1956. These supplements did not apply to superannuitants whose pension benefits amounted to £250 or more a year, and they also were mainly confined to those who had retired before 1955 (before 1952, in the case of L.M.S.R. superannuitants). The additional supplementation now to be introduced will benefit all railway superannuitants who retired up to the end of 1955 (1952 in the case of L.M.S.R. superannuitants), including several thousands who so far have received no supplements. Increases ranging from 12 per cent for those retired before July, 1946, to 2 per cent for those retiring in 1955 (1952 in the case of L.M.S.R. superannuitants) will be awarded, with minimum increases from £40 to £10. There will be a maximum supplement of £100. Pensions increases will not apply to superannuitants who, at the date of retirement, qualified as compulsory contributors for the State Retirement Pension. The supplements will apply from April 1, 1961.

Increased activity on South African Railways

DESPITE the fact that South African Railways is at the peak of operating efficiency, as a result of a steady expansion programme since the war, demands for the movement of traffic this year are building up to make this one of its most active years. There is every indication that goods traffic will be at its highest level in the coming months. The railways will be called upon to move record quantities of maize and other agricultural products as well as large tonnages of iron ore, manganese, chrome, and increased quantities of coal. Railway revenue is climbing and a tight control is being kept on spending. As a

result the Railways Administration is showing a profit of nearly £8 million for the first nine months of the current financial year. It is maintaining its average of nearly £1 million a month profit. From April to December last year S.A.R. railings of all mineral products showed a spectacular increase and reflected the sound position of the country's economy.

Call for changes in Pipeline Bill

PETITIONS asking Parliament to make drastic changes in the Trunk Pipelines Bill, which would authorise the construction of pipe lines from Canvey Island to terminal points in London and then on to the Grand Union Canal at Denham, were laid before the Commons last Monday by the London County Council and 14 other local authorities through whose areas the pipelines would run. The pipeline system would be used for the transporation of crude oil, petroleum, mineral oils, natural gas, and other fluids. The L.C.C., in its petition, states that the conveyance of petroleum spirit and other highly inflammable liquids through urban areas presents very serious fire and explosion risks. The L.C.C. proposes an amendment to ensure that Trunk Pipelines Limited will satisfy the Government about design, structure and construction of the whole installation before it is brought into use, and the Government will be able to prohibit the use of pipelines for conveying any fluid which may cause danger or risk to the public.

Golden Jubilee celebrations

FROM May 10 to May 12, the Institution of Locomotive Engineers celebrates its Golden Jubilee year. The Council of the Institute is finalising the details of these celebrations, and the notice with application form will be circulated to all members within the next few weeks. A provisional outline programme covers a reception by the President, Mr. D. C. Brown; a luncheon at the Dorchester Hotel, Park Lane, London; a lecture by Sir Brian Robertson, Chairman of the British Transport Commission; an exhibition of locomotives, past and present, arranged by the courtesy of the British Transport Commission, and an informal dinner, followed by dancing, at the Dorchester Hotel, London. The celebrations will cover three days, and will also include an all-day visit. There will be two free afternoons, and one free evening.

Explaining the trouble

CONTINUING its tradition of good public relations, the Southern Region of British Railways has produced yet another of its excellent news-sheets for distribution to passengers using all Southern main line trains from Waterloo to Cornwall. The latest report explains the reasons for train delays resulting from recent landslips, and give an estimate of the duration of the engineering work necessary to put matters right. Headed " Engineers and traffic chiefs give the reasons", the news-sheet contains three items: a brief résumé of the trouble; a detailed account of how it came about – this is illustrated by three line diagrams showing the extent and nature of the slips – and a message from Mr. Percy White, Assistant General Manager (Traffic), in which an apology is offered for inconveniences suffered by passengers. Following established Regional practice, the news-sheet is produced in tabloid form; is well-written, and easy to read.

Open forum at Harrogate

THE OPEN forums of the North Eastern Region of British Railways are especially interesting for the light they throw on the specific traffic problems of the areas in which they are held. The most recent forum – at Harrogate last Thursday – showed that the re-timing of one main-line passenger train to provide a faster service can arouse great resentment among those whose local trains are affected by the change. This is a good example of the truism that, in a relatively small area congested by heavy and varied traffic, it seldom is possible to improve one railway service without affecting others operated in close conjunction. The meeting was prefaced by an excellent film produced in colour by the British Transport Film Unit on the latest achievements of British railway modernisation. A feature of these forums which goes far toward explaining their success is the smooth organisation affecting the seating, refreshments, and so on. These are always well planned and reflect great credit on those responsible.

Research on Japanese National Railways

THE JAPANESE National Railways has an excellently-equipped and up-to-date Technical Research Institute dealing with a wide field of subjects. Its activities are largely distributed among a number of laboratories, each responsible for a group of investigations. The Soil Laboratory is at present concerned particularly with those in connection with the proposed Tokaido Trunk Line, and during 1960 they included full-scale tests to determine reasons for and prevention of embankment slope-failures and slips, formation stability and improvement, foundations of bridges, earth pressure upon structures and general soil investigations. In the embankments a great variety of soils were studied at different places and the effects of water and drainage were assessed with modern instruments. To simulate rail traffic a special electric vibrator was devised to produce intermittent loading on the rails.

Re-organisation on Rhodesia Railways

IN an attempt to achieve unity of command and quicker decisions on staff and other matters, Rhodesia Railways has announced that the system of departmental control is being replaced in stages by the " divisional " system. Under the divisional system, there is being established three Regions, one covering the Salisbury transportation district, the second the Bulawayo transportation district, and the third the Broken Hill and Livingstone districts. Each Region is to be under the control of a Regional Manager, with greater powers than were vested in district officers, who will be responsible for all day-to-day operations within his Region—operating, commercial and mechanical (other than workshops), civil, signal and communications, and electrical engineering. In respect of the engineering functions, day-to-day operations cover maintenance and minor new works. All the staff on the Region will be the responsibility of the Regional Manager who will owe allegiance not to a department but to the Railways as a whole, represented in the Region by the Regional Manager.

At headquarters the former departments are being replaced by five divisions, each covering an easily defined sector of the railway undertaking. The five are as follow:

(a) The operations Division responsible for the general supervision and co-ordination of the day-to-day work of the Regions.
(b) The Engineering Division, responsible for the provision of the track and its appurtenances, signalling, communications, electrical supplies and all major new works, and the means of movement.
(c) The Commercial & Accounting Division, responsible for the economic well-being of the undertaking.
(d) The Planning, Research & Co-ordination Division, which will do the 'backroom' work, cover the long-term planning, effect the essential co-ordination between the Divisions and maintain the necessary " control " statistics.
(e) The Personnel Division, which will control policy for both European and non-European staff and cover the day-to-day work in respect of all head office staff.

This is only a bare outline, and there will be many innovations within the Divisions and the Regions. The important factor is that there will be no more departments as they previously functioned. For instance, the former duties of the Chief

Commercial Manager are being split between first the Regions, who will undertake all day-to-day control of rating and claims, goods sheds, parcels offices, booking offices, liaison with the public, road competitions, and so on; second, the A.G.M. (Operations) who will control major claims; and third, the A.G.M. (Commercial & Accounting) who will be responsible for charges policy.

The Catering Department will be a branch of the Operations Division, and the Stores Department a branch of the Commercial & Accounting Division. The engineering departments, both civil and mechanical, will be branches of the Engineering Division which will also embrace electrical and signals and communications. The African Affairs Department is integrated into the Personnel and the Engineering Divisions and the Regions. The Accounts & Finance Department and the Transportation Department also undergo minor changes. The Medical Department forms part of the Personnel Division.

In the new organisation, the posts of Deputy General Manager, Principal Executive Officer (Technical), Principal Executive Officer (Movement), and Programme and Statistical Officer, are abolished, and the General Manager will be assisted in future by a Management Executive consisting of the heads of the five divisions.

A change of this magnitude can only be effected by stages, and it will be some months before the changeover is complete. Although officers and graded staff may find themselves under new control or transferred to other duties, there will be no reductions in pay and no retrenchments.

The Rhodesia Railways Board has in the meantime approved the following appointments: Assistant General Manager (Operations) Designate, Mr. L. A. W. Hawkins; Assistant General Manager (Engineering) Designate, Mr. A. M. Hawkins; Assistant General Manager (Commercial & Accounting) Designate, Mr. R. Allan; Assistant General Manager (Planning, Research & Co-ordination) Designate, Mr. H. J. N. Collis; Manager, Personnel Division, Designate, Mr. E. A. Cordell; Regional Manager, Salisbury, Designate, Mr. C. S. Robertson; Regional Manager, Bulawayo, Designate, Mr. T. A. Wright; Regional Manager, Broken Hill, Designate, Mr. K. M. MacDonald; Principal Executive Officer (Special Duties), Mr. A. H. Croxton.

The Staff will be advised from time to time of the progress made on the introduction of the new organisation and of all officer appointments in the new divisions and on the Regions as soon as the Management Executive, which will in future make selections for all officer posts, has made its decisions.

Successful C.I.E. drive for traffic

THE rise in goods receipts of Coras Iompair Eireann is largely the result of drive on the part of management and staff. The geography of the Republic of Ireland is not favourable to railway traffic. There are few large industrial centres or long hauls. Much has been accomplished under the leadership of Dr. C. S. Andrews, Chairman of the C.I.E. board. It was stated early in December that railway goods train receipts to date had been £141,500 more than a year previously, passenger train merchandise receipts £22,000 more, and C.I.E. road services £183,500 more, or an increase of £347,000.

These results are attributed mainly to the new policy being implemented by the Freight Sales Division of the Commercial Department. The revenue from " package deal " agreements with individual firms and other large-scale consignors, has increased steadily. At the end of March, 1960, after the first full year of the package deal scheme, a total of 342 deals with an annual revenue potential of £235,000 was secured. Encouraged by this, the board of C.I.E. set a " new business " target of £500,000 for the current year, an ambitious task, and each station has been allocated its own objective.

At the end of October, in seven months campaigning, 203 new package deals, with an estimated annual potential of £260,500, were secured. Not included in this figure are many small lots of new traffic, which have been won by vigorous and sustained selling methods.

The new package deals have been secured under varied headings, with livestock heading the numerical list at 48 deals so far. Most lucrative of the deals are 20 for fertiliser traffic at an estimated value of £107,000. Motorcars were the first traffic tackled in the new drive. In two years the Freight Sales Division had more than doubled the C.I.E. motorcar business. The comparative figures for the years ending March, 1959, and March, 1960, were 3,251 and 7,707 cars respectively. In the first six months of the current year 7,212 vehicles were carried.

Since the introduction, a year ago, of a scheme of rebates for livestock, 182 deals were concluded with an estimated additional rail revenue of £49,000. The progress of this scheme was affected by the adverse conditions prevailing in the livestock industry to mid-summer of 1960, and, when trade had improved, the shipping strikes adversely affected the position. There has been a marked recovery in recent months and it is expected that the present heavy carryings will continue for some time.

Explaining work study

TO record the progress and development throughout the nationalised transport undertaking, and more particularly British Railways, the British Transport Commission is issuing a new publication, *Project*, to appear three or four times a year. The first issue was published last month. The principles of work study are regarded by the management and by the trade unions at a national level as a common-sense method of increasing efficiency by making best use of manpower, materials, and equipment. This was declared in October, 1960, by the British Railways Productivity Council in a staff information sheet. The unions, besides establishing their own arrangements for work study training and making use of the Trades Union Congress training school, have arranged for many of their officers to attend courses at the British Transport Commission Work Study Training Centre at the Grove, Watford. The Commission is one of the largest users of work study methods in the world, and the various activities of British Railways, involving almost all grades, are the subject of investigations which in kind, scope, and complexity have never been attempted elsewhere. The daily tasks of over 40,000 B.T.C. employees have been reorganised through these methods. Many more jobs are to be studied as techniques are applied on a comprehensive scale to operations hitherto regarded as outside their scope. Some railwaymen have been concerned in such schemes for some time, notably in civil engineering on the Southern Railway and its successor, British Railways, Southern Region; but application of work study has made great progress in nationalised transport in the past four years. In 1956 Mr. E. J. Larkin was appointed Director of Work Study at B.T.C. headquarters. In the past four years more than 1,400 people have received basic training, and many of these have since had considerable experience in work study techniques. Some 7,000 staff of all grades have attended courses at Watford or at one of the six schools in the Regions of British Railways. Much is being achieved by the B.T.C. Work Study Development Committee, the main co-ordinating and technical body concerned with this subject. The Work Study Sub-Committee for Civil Engineering has done important work to maintain the rapid expansion of techniques in this field, notably in the Western Region. Similar sub-committees have been set up for supplies and contracts and for signal maintenance. The latest, the Motive Power Sub-Committee, is concentrating on application of work study in the maintenance and servicing of diesel locomotives.

To many employees, including some officers, of British Railways and other undertakings of the Commission work study is still unfamiliar. Despite the co-operation of the unions, opposition to it seems to linger, partly through reluctance to

change familiar ways of working and partly through suspicion that it may increase redundancy. Its application will be increasingly welcome as knowledge increases. All railwaymen, and more particularly those in responsible positions, should know what is being achieved through work study in departments other than their own. To judge by the first issue of *Project*, that publication, with its well-illustrated articles, and book reviews, will help greatly to increase understanding and dispel prejudice. As to the latter, the Chairman of the Commission, Sir Brian Robertson, points out in a preface: " Fierce competition menaces our industry and . . . the jobs of those who work in it. Work study helps to keep this competition at arm's length."

The scope and potentialities of the new techniques are clearly outlined in an article by Mr. Larkin. Among them are " Memomotion," or job observation by camera or time-lapse photography; and " activity sampling," sometimes known as " work sampling " or " random observation." On British Railways, he states, over 1,000 work study schemes are in operation, and many more are being investigated. Most of them are concerned with civil engineering, and more particularly track work. The scope of others includes handling of goods traffic, reservation of seats, passenger station working, organisation of a packet port, carriage cleaning, and maintenance of motive power and line-side signal apparatus. Proposals now being considered concern all aspects of traffic operation. Most of the schemes that are working or under investigation relate to existing facilities and past practice; but if the benefits of work study are to be realised fully, it should be used in planning new works. The possibilities are immense. Preliminary work study investigations into the proposal to amalgamate two provincial stations resulted in a saving of £130,000. It was found that an estimated outlay of £250,000 on a new maintenance depot could be avoided through improved efficiency. With pre-planning the first aim is to determine the optimum performance or capacity with the existing arrangements. This is used as the basis for future needs, on which it is often possible to make more precise forecasts of what staff and equipment will be necessary to operate the new arrangements. Application of work study to diesel shunting locomotive maintenance at a large depot resulted in four fewer locomotives being required for the same work. Mr. Larkin gives a timely warning: despite the good will of the trade unions, railway managements have " not been handed a blank cheque." Union officials, besides the men concerned, wish to see how any scheme works before they accept it. Although the official consulting and negotiating machinery helps, more is needed in introducing work study to employees. The method of approach when actually doing the job on the ground is most important.. Nor is work study a panacea. If traffic is not available to be handled, work study can do little; but it can ensure that each job is done efficiently and economically, and so facilitate the better service which attracts traffic.

Accounts in *Project* by three railway officers who specialise in work study show what has been accomplished by these methods in the Regions. Their application to a bonus incentive scheme for signal maintenance staff in Scotland is described by Mr. A. B. Allison, Work Study Assistant to the General Manager, Scottish Region. The problem involved variations in the time taken to walk or go by train between depots and signalboxes and equipment on line, and in the amount of work available. The article describes how, allowing " balance time " where conditions prevented men from achieving the same performance as staff in more concentrated areas, bonuses were calculated in differing circumstances. Contrasted with this is the application of work study techniques to the reservation procedure in the Southern Region Car Ferry Centre in Grosvenor Gardens, London, S.W.1. This is recounted in detail by the Organisation & Methods Officer of the Region, Mr. C. H. Titchener. Use of pre-printed reservation cards and of rotating files has achieved great economies of effort, as shown in diagrams. Uses of work sampling in his Region are outlined by Mr. S. Russell, Productivity & Work Study Officer, Eastern Region. Information was obtained on the duties of staff in a motive power depot which it would have been uneconomic to procure by the more usual forms of measurement. In a parcels depot it was possible readily to assess the proposed optimum staff requirements and the proposed handling cost per parcel. In a preliminary survey of the arrangements for dealing with goods and passenger traffic at a packet port, work sampling afforded valuable data on the number of staff required. The value of this preliminary work is shown by the fact that at one parcels depot in the Eastern Region, at Liverpool Street, subsequent investigation proved the assessment by work sampling to be within 5 per cent of the eventual result. The importance of human relations and their place in work study are discussed by Mr. R. W. Bailey, Productivity & Work Study Assistant to the General Manager, London Midland Region. Analogies between operational research and work study are drawn by Mr. A. T. Wilford, Director of Research, London Transport Executive, with some useful accounts of investigation into the optimum number of doors in L.T.E. Underground tube stock and into delays in entering and leaving tube cars caused by " perch " seats.

U.N. railway statistics for 1959

THE Annual Bulletin of Transport Statistics for Europe for 1959, recently published by the United Nations, throws interesting light on railway operations during that year and indicates that in those countries, enjoying—or suffering—a high degree of motorisation, the trends have been similar. Thus, generally speaking, there was a more intensive use of the railways with carryings in both passenger-km. and ton-km. rising; receipts per passenger-km. rose in practically all countries, but, in most, fares rose less, or only slightly more, than the cost of living; staffs were further reduced; the move towards electrification continued apace, and more uneconomic lines were abandoned.

Britain appears to be falling behind some Western European countries in traffic density per km. of line because in regard to both passenger-km. and ton-km. per km. of line a year British Railways was exceeded by those operated in Western Germany, and while France carried more ton-km. it reported fewer passenger-km. Britain topped the league table for passenger train-km. with the figure of 402 million, Western Germany coming next with 378 million, but the latter carried more passengers: 1,309 million against Britain's 1,069 million. The average length of journey was greater on British Railways than in Germany; 34 km. compared with 29 km. In France, journeys averaged 56 km. The average number of journeys was generally lower in Britain than elsewhere; 21 a year and 25 in Western Germany. In France it was only 13.

Failure of fares on British Railways to keep pace with the rise in the cost of living is shown by the index based on 100 for 1950. The level in Britain for 1958 was only 82, whereas for Western Germany it was 120 and for France 103. In fact, only in Norway had fares risen less proportionately than in Britain. The picture concerning freight charges is the opposite, with charges on British Railways rising proportionately more between 1950 and 1958 than had those in any other European country for which statistics are available. Again taking 1950 as 100, the British Railways figure for 1958 is 147, Western Germany's 121, and France's only 92. This may account in part for the interesting revelation that in comparison with other countries the total and, more important, the proportion of all traffic carried by rail is comparatively lower here than in comparable countries. Ton-km. of British Railways were 29,000 million, of the German Federal Railways 48,000 million, and of the S.N.C.F. 53,000 million. It is not surprising, therefore, that where figures are available, the percentage of total freight carried by rail expressed in ton-km. was lower on British Railways than in any other European country except Italy, namely 42 per cent, with 43 per cent in Germany and

60 per cent in France. This is made even more significant when it is considered that the percentage carried by inland waterways in these countries is so much greater. This accounts for the fact that as the percentage carried by this form of transport is only 1 per cent in Britain, but is 11 per cent in France and 32 per cent in Germany, the proportion of all freight traffics going by road in Britain is the highest at 57 per cent, against 29 per cent in France and 28 per cent in Germany.

In the 10-year period 1950-59 the percentage of European lines electrified rose from 8 per cent to 12 per cent and involved the conversion of 21,000 km. Because main electrification has been carried out on lines carrying the heaviest traffics, figures giving the percentage of line electrified understate the relative importance of this form of traction. In Belgium, for example, where the gross ton-km. carried by electric traction amounted in 1959 to 39 per cent of the total, only 19 per cent of the length of line was electrified by 1959. Similarly, in the Netherlands, where half the system was electrified by 1959, electric train km. represented 70 per cent of total traffics. The conversion from steam to electric and diesel traction is reflected in the statistics of railway motive power which show a gradual substitution of electrical and diesel locomotives for steam, although total numbers are less because of their more intensive use. This also accounts, in part, for the reduction in staff, and implies an improvement in labour productivity, no doubt resulting from varied capital investment. The reduction in Britain of 14·3 per cent in staff during the 10 years 1950-59, while substantially higher than the average decrease, showed a smaller decline than the S.N.C.F., which reduced its staff by 19 per cent, and Belgium's railways, which did so by 17 per cent. Figures for Germany are not available.

Another interesting tendency is for the number of railway wagons to be reduced, but for their carrying capacity to rise. The former total fell by 3 per cent and the latter rose by 11 per cent. There has also been an increase in the number of wagons of special type, such as refrigerator and tank wagons, as well as containers. British Railways had the worst record for turn-round, as well as a poor one for average loadings. The average wagon turnround of British Railways was 13·4 days, an improvement of only 1·4 days on 1954, whereas Germany's average was six days, an improvement of 1·5 days on 1954. France was 10 days against 11·8.

It should be borne in mind that not all the statistics presented in this voluminous report are strictly comparable because they are not always compiled on the same basis, are not standardised and, also, different geographical and stages of development affect the returns.

Architecture on railways

STATIONS, bridges and other railway structures are included in the new-found wide interest in 19th century architecture. Whether this concern extends, except in the minds of a few people, to contemporary structures on railways, as opposed to modern architecture in general, is doubtful. Railway structures tend to be prominent in the small-scale landscapes of Britain, where they are not dwarfed. Development of techniques such as electric traction affects the aesthetics of the architect's handiwork. An instance of this is given by Dr. F. F. C. Curtis, A.R.I.B.A., Architect to the British Transport Commission, in his recent Alfred Bossom Lecture to the Royal Society of Arts. After criticism by a Member of Parliament of a new signalbox, he was one of a party which inspected that building which, he admits, is an appropriate solution of a particular design problem. He observed that "the real blot on the landscape" was the multiplicity of different types of electric overhead equipment, most of it well designed, but somewhat arbitrarily placed on the ground. In consequence, the signalbox was left unaltered, but it was agreed that in future an architect should accompany the engineers during the first walk-about survey and have a say in the arrangement and choice of types of overhead equipment as electrification proceeded. This incidentally shows the concern of British Railways management for good visual effect. In congested Britain, Dr. Curtis points out, the problem of coping with modern transport is made especially difficult because its space requirements are so enormous in relation to the total space available, and so is the cost of any measures to confine it. The horizontal spread of car parks for instance is a very expensive luxury. The demands of railways for ground space are much less in proportion to the service they render to the community.

When the railways first came into being, the humanist tradition was still alive. The problems facing the railway pioneers, he emphasises, were comparable in their technical complexity to those faced today in respect of motorised road and air transport. Yet during the first two or three decades at least, they were solved in a bold and far-sighted manner. The change brought about by the introduction of railways resulted in the disturbance of old-established habits and institutions. Nevertheless, the new could compare well with the old. There was more space for a smaller volume of transport. The railways were saved from creating the kind of chaos that road transport causes today because they were segregated on their own tracks. Railway pioneers had to satisfy entirely new requirements and execute works on an enormous scale. Building the London & Birmingham Railway was a far bigger undertaking than that of the M.1 motorway, both in its physical size and in relation to the technical resources available at that time. There was no example to copy in the design of the train-shed at Paddington or the workshops at Swindon.

The increasing complexity of life with an ever-growing population, the growing density of traffic, competition between the many railway companies and finally between different kinds of transport, and failure to cope with the human problems, gradually led to chaos. The old stations became too small to serve increased needs; excrescences spoilt some of the finest railway buildings; the approach roads and forecourts became too cramped to accommodate feeder traffic. The "railway slums" came into being and now present a formidable task of clearance. To pay for this, Dr. Curtis believes, especially with the large terminal stations, it will be necessary to exploit the opportunities of property development. The termini in London and some provincial cities can be developed without adding much to the traffic in the streets, as office buildings, flats, shopping centres and exhibition halls over a railway station can be reached direct from the station concourse by people arriving by train. Creation of building sites where there were only tracks and platforms offers a chance for new stations to become the focal points of urban centres.

Mention is made in the lecture of the era between the railway pioneering days and today, when the requirements of transport were met in an adequate and imaginative manner. This was the age of Frank Pick, as Vice-Chairman of the London Passenger Transport Board, and of Charles Holden as designer. Their achievement was unique. They travelled abroad and observed, but nowhere could they find the consistent design policy which was, on their initiative, to emerge in London Transport and become evident in everything from rolling stock to posters and from buildings to escalators and other items of station equipment. It was all achieved in a few years, and so unobtrusively that the general public was almost unaware of this revolution in taste and manners and calmly accepted the change. In some countries large new railway stations have been built in recent years without any large-scale commercial development to pay for the cost, although it appears that the proposals for the reconstruction of the 30-year-old main station in Milan include property development.

Dr. Curtis draws attention to the excellence of the design of several stations which have been featured in this journal. There are for instance the new structures of the Netherlands Railways, such as the Amstel Station at Amsterdam. Rome Termini Station, completed in 1950, is, he maintains, still without rival, and apart from purely aesthetic considerations is very skillfully planned to make full use of the conditions

British Railways has its own architectural triumphs, such as the new Manchester Oxford Road, completed in 1960. This is a medium-size urban station at a Y-junction, remarkable for its laminated timber roof. Small stations between Manchester and Crewe, completed in 1960, are all based on a unit construction system adaptable to varying local conditions and capable of being assembled on the site with a minimum disturbance of traffic. There is a distinct family likeness of all the smaller stations on this line, intended to be carried on to the south of Crewe, and the large stations in Manchester, Crewe and Stafford will form " punctuation marks." Nearing completion is Coventry Station, planned in collaboration with the city architect to fit in with the local authority's town planning. The design provides for segregation of the several traffics, and the complexity of accommodation within the building is skilfully contained in a very simple and telling form. Harlow New Town Station, is one of the best buildings in the new town. Hadley Wood Station (1959) is a small suburban station, with, in Dr. Curtis' words, " all the virtues of restraint and honesty." Plymouth North Road, to be finished at the end of this year, will be an outstanding exception to the disappointing quality of post-war reconstruction in the city. As yet, this country has no new stations comparable in size to those in Rome or Vienna, but in the quality of design it does not lag behind. The interiors of some of the new trains o British Railways show that a similar new look is emerging in rolling stock design, and the same is true of some British Railways ships.

Rate considerations

THE greater freedom in determining rates already accorded to British Railways has not resulted in the increase in revenue for which many people have hoped. There has been some increase in tonnages originating in the past 12 months, notably in mineral traffic, and a smaller increase in ton mileages; but the volume of railway freight traffic has not kept pace with the growth of economic activity in Britain. Apart from the growth of " C "-licence transport by traders in their own road vehicles, it has been suggested that the relatively small receipts are the result of quoting low competitive rates. Competition is intense, and some rates quoted by railway officers to capture traffic no doubt have resulted in receipts per ton-mile which have more closely approximated to the cost of doing the work.

The extensive costings organisation of British Railways has been created to guide the officers who must determine at Headquarter, Regional, and lower levels, the rates which can be quoted to railway users, whether to large industrial and trading concerns with nation-wide commitments, or to clients dealt with by district commercial officers. It is axiomatic that railways should not carry traffics at less than the cost of movement. Movement of commodities such as coal, ore, sand, and gravel, it is often stated, has been subsidised by the higher rates charged for textiles, machinery, and other merchandise. Cost studies have revealed that this opinion has not always proved accurate. Where coal or ore is handled in train-loads, with the consequent avoidance of shunting and allied costs, the true cost of movement is very low and rates have proved, in practice, compensatory.

The principles, as to rating, of the late Arthur Twining Hadley, at one time President of Yale University and a Director of two large American railways, the Santa Fe and the New Haven, were backed in Europe by the late Sir William Acworth, an authority on British and Continental European railways. It has become fashionable to dispute their theories, which were accepted in their time. The suggestion that the principles they enunciated would be accepted again at their full value was made by Mr. C. E. R. Sherrington, Director, Research Information Division, B.T.C., in a comprehensive paper presented to the recent Pan-American Railway Congress in Brazil. Briefly, those principles were that a railway's minimum rate charge should not be less than the cost of movement, including overheads, and that the maximum rate should not be more than what the traffic would bear. This, it is suggested in his paper, often has been misinterpreted to mean that a railway could charge all that subscribed to such a theory. What the traffic can bear is limited by such qualifications as market competition and the ability to meet in a common market the sale price of imported goods c.i.f. Some railway rates reflect great elasticity of demand, whereas others reveal complete inelasticity, but the commercial officer must fix them so that the volume multiplied by the charge will yield the maximum net revenue, taking into consideration the cost of handling. Because of its road haulage undertaking the British Transport Commission is equipped to have at its disposal a vast store of information on the respective costs of movement by rail and by road.

The increase in carriage by industries in their own road vehicles is very large in many countries, more particularly where roads are well developed. In the U.S.A., Mr. Sherrington states, it is estimated that only 30 per cent of the total road freight movement between cities is handled by public carrier. This has created a need for complete reappraisal of the situation and no country, so far as is known, has attempted to restrict seriously the growth of the private carrier. Threats of, and actual, railway strikes have caused many industries to provide their own vehicles. Many of the latter are of special design, to carry oil, sugar, acids, cement or flour in bulk, for example, or are particularly suited to livestock haulage, distribution of meat, canned goods, bricks, tinplate or furniture, which may be liable to damage in rail or other public carrier service.

The railway rate structure today, according to one view, is regulated by costs as assessed by the private carrier. The latter, however, may judge the advantage of using his own vehicles on considerations other than cost, such as publicity, convenience, and the benefits of a specialised vehicle. Costs may be hard to assess because of the interlocking of the road transport activities with those of the manufacturing activities of the business. If it is difficult to calculate road haulage costs, it is far more difficult to determine railway costs in respect of individual movements. In the U.S.A. the Interstate Commerce Commission, Mr. Sherrington points out, has long laid down a code for the division of passenger and freight movement costs. The results are seen in the formidable deficits shown in recent years for passenger train operation; but many people in America are by no means satisfied with the picture thus presented and consider that there are intangible advantages derived from passenger train operation, such as prestige.

Technical achievements such as the development of diesel and electric traction have not been enough to ensure prosperity for railways in a time of far-reaching social and economic changes. In some countries overseas there has been insufficient attention to railway charging methods, which nevertheless are not wholly determined by the railways whether nationally or company owned. Value of service as an element in rate making has possibly lost some of its value in relation to other considerations. It remains, as Hadley stated, the prime factor in the design of a rate scale, because it is useless for a railway to quote a rate that the traffic cannot bear; if it does, the traffic ceases to flow. The example set by Britain in freedom in rate quotation, which is to be increased, is worthy of study by railways overseas. It may enable many miles of railway to continue in reasonably profitable operation.

A.A.R. Report for 1960

BY A CORRESPONDENT

IN a foreword to the 1960 report of the Association of American Railroads, the President, Mr. Daniel P. Loomis, states the industry made more satisfactory progress despite depressed earnings for the third consecutive year. The A.A.R. opposed many proposals adverse to the railways' interests, with success.

That was a reward for the submission of 75 statements to Congressional committees on a great variety of subjects.

Throughout the past year, the Public Relations Department made strenuous efforts to advise the press and the public about the need to revise outmoded work rules which swelled operating costs. Of 5,000 newspaper editorials received by mid-1960 over 87 per cent strongly supported the railways' call for a revision, and the influential magazines published articles analysing the work rules problem. Mr. Loomis declares that the railroads have " never entered an important negotiating session with a greater backlog of public support and understanding."

As from September, 1959, many railways subscribed voluntarily to a " Service Interruption Insurance Plan " to cover their losses through any state of emergency. The A.A.R. reports that, during the first year of the scheme, several strikes, including serious stoppages on the Pennsylvania and Long Island, led to five claims. Four of these were paid in full by the Imperial Insurance Company. All the railways which originally started the insurance plan renewed their policies for a second year, and one more undertaking took out a policy. In the meantime the Brotherhood of Railroad Trainmen has filed a suit challenging the legality of these policies, but the A.A.R. is confident that " the Plan conforms in every respect to the law and the public interest."

Mr. Loomis stresses the co-operation between the Association and the study group appointed by the Senate to review Federal transport policies and related problems. An advisory council was established to work with the study group. Mr. W. T. Faricy, retired A.A.R. Chairman, acts as the railroad representative and under his guidance 17 reports were submitted to the study group on important transport questions, such as " Consolidations and Mergers in the Transport Industry," " Federal Regulation of Transportation," " Railway Freight Wagon Supply," and " User Charges to recover the cost of Federal aids to Domestic Transport."

Mr. Faricy described the report on user charges as a summary of the views of the American railroads, but with an appendix it ran to 37 large pages of typed material. In effect, the report brought up to date the statement made by Dr. J. H. Parmelee, when he was Director of the Bureau of Railway Economics, to a Senate sub-committee in 1950, that, in existing conditions of regulation, taxation, and public aid, the efficiently operated railroads, in a period of business prosperity, could not earn enough to attract investment in improved facilities.

Mr. Loomis expects the study group's report to be completed early in 1961 and is hopeful that it will lead to new transport legislation. He thinks that " there are indications of a growing recognition that Government transport policies and practices are in need of further revision."

The pity is that at present the railroad position is deteriorating and there are few signs of improvement in the economic activity of the U.S.A. The transport situation may call soon for action by the new President.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

RAILWAY CONVERSION

January 18

SIR, The conversion of railways to roads has clouded the railway scene for over five years. It has cost the country dearly in official vacillation, delay and obstruction. Its shadow should be removed fully and finally.

The arguments for conversion have been made with much enthusiasm and considerable effectiveness, within the framework of certain basic assumptions. If these assumptions are not challenged it may well be true that the converted railway network would be able to perform its former tasks. No good is done to the railway cause by refusing to consider this possibility.

If the basic idea of a railway is to be justified successfully, arguments more effective than those based on hypothetical line capacities must be found. Nor is the issue of road deaths entirely relevant for the majority of casualties occur within cities, while the railways do their business between cities.

It is surely the development potential of road and rail that is the decisive comparison. As safety precautions multiply and the cost of labour encourages increased application of automation, it seems likely that road traffic operation will increasingly resemble that on rails, yet lacking the advantages inherent in those rails.

It has been stated, I believe by Monsieur Louis Armand, whose authority here can hardly be in dispute, that the railway, of all forms of transport, is the one most suited for the application of automation techniques.

Developments in France and Japan have shown that rail transit speeds much faster than those of the present are feasible, making the railway competitive in performance with internal air services. On the other hand, road speeds on motorways do not seem likely to rise much above present levels with safety.

Railways came into being to perform a task which could not be done by other means. They are challenged today, because other means, apparently more flexible and simple, exist. Their survival depends on their ability to continue to evolve and thus to perform, once again, tasks which their rivals cannot practically undertake.

The keys to the future are automation and speed, allied to the reliability which was once a characteristic and which should be the foundation of any railway service seeking commercial viability.

Yours faithfully,

GEORGE A. DAVIDSON

Monkdyke, Bridge-of-Weir, Renfrewshire.

GLASGOW ELECTRIC TRAINS

January 20

SIR, I have been reading Brigadier C. A. Langley's interim report in your January 20 issue. It passes my comprehension that up to December 21, 1960, general overheating of the transformer windings, *i.e.*, the so-called " thermal theory," was believed to be causing the trouble. Why was no transformer completely stripped immediately when the cooling oil expanded so rapidly that normal vents could not take care of it ? A transformer rated at 970 kVA. and weighing 4 tons would normally have ample thermal capacity to prevent any rapid build-up of cooling oil temperature and pressure due to 100 per cent overloading for intermittent short periods. Normal vents should easily take care of it.

I presume that on October 30, after the explosion in the equipment compartment and when it was found that the secondary winding had seriously overheated, the transformer was opened up. Why were the faults discovered on December 21 not detected on October 30 ? They surely existed then, and had they been discovered the service would not have been allowed to start on November 7.

Lack of both theoretical and practical experience is shown in the fact that the engineers should have made modifications to allow the excessive build-up of oil pressure to escape more easily, rather than to discover and eliminate what was causing this build-up.

In the report it is stated that the dual high voltage had no part in the transformer failure. Perhaps not; but the fact that

the primary has to be wound in four sections and connections brought to change-over switches in the transformer casing made it more difficult to make the windings secure against movement due to severe electro-magnetic forces. I presume that the failures to date have been on the 6·25 kV. section and and that no 25 kV. has been involved.

Yours faithfully,

HERBERT CHARNLEY

Brook House, Clayton-le-Woods, Lancs.

TRANSPORT EXPENDITURE

January 20

SIR, Mr. J. White, whose letter is published in today's issue, is quite wrong. Road maintenance is largely paid for out of the rates. As I only use the road to walk along the footpath to the station I resent this impost. My rates returns show quite a large item for road maintenance, to which must be added the bill for street-lighting, drainage, police, traffic lights, and so on. Add also the value of the human lives lost in road accidents.

Deduct from the railways' deficit : interest charges (none are payable on the nation's capital locked up in the road system, even new roads), fencing costs, bridge maintenance costs where the bridge carries a road, half the cost of level crossings, rates, and an item to cover all those legal obligations borne by the railways but not by the roads. I refer to the maintenance of unremunerative services, the condition of accepting all traffic, the submission to maximum rates and fares, and the provision of waiting rooms, lavatories, and so on, for passengers, when these are provided at public expense for travellers by road.

This week we have heard that a further loss on the airports has been written off ; the total loss to-date, *plus* the accumulated assistance and subsidies given to the airlines, must be comparable with the railways' accumulated deficit.

If the public is to make a balanced judgment on the merits of different forms of transport, there must first be a uniform and simplified system of presenting accounts.

Yours faithfully,

R. G. R. CALVERT

45, Woodwaye,
Oxhey, Herts.

BRITISH RAILWAYS ASSESSED

January 22

SIR, The statement by Mr. F. E. Lamond in your January 20 issue, that " London suburban services . . . are second to none in comfort, speed, frequency, and reliability," is not relevant. London suburban services, considered collectively, are neither operationally nor economically as efficient as they should be. (That is not the fault of the railwayman on the line.) If our railways are to survive as an effective public transport system they must operate much more than suburban services.

British Railways is operating at only about 40 per cent of its potential efficiency. If comparison is to be made with foreign railway systems I suggest that it be with that of Western Germany. The German Federal Railway in a year carries something approaching 50 per cent more passengers than does British Railways, and an equal amount of freight, while employing about 18 per cent fewer staff and much less stock.

Suburban services may be expected to extend some 40 miles around London. Does Mr. Lamond consider the services from Euston over this distance to be all that they might be ? Comfort : passengers sit six-a-side in compartments with windows opaque with dirt. Speed : 31¼ miles with five stops in 60 min., and 17½ miles of this non-stop in an average time of 28 min. Frequency : see Table 53 in the London Midland Region timetable ; is it unreasonable to expect a service to Cheddington after 7.15 p.m. ? Reliability : I arrived in London 12 and 17 min. late on the last two occasions.

As Mr. Lamond's defence of British Railways dealt only with suburban services, and as he then changed sides and criticised the B.T.C., I assume that he agrees generally with my letter in your issue of December 16, 1960. Everything I wrote was a fact which could be substantiated. I stated : " If the timetable is standardised it is perfectly feasible to introduce fast trains or for that matter, any type of train." There should be a basic standardised pattern of train services for the whole of British Railways. Maintenance of the services would be the responsibility of the Regions. Integration of services and compilation of timetables and their presentation to the public would be effected by a central timetable authority. Supplements to the timetables would be eliminated. In normal conditions alterations to services would be made only twice a year, and then subject to the approval of the central authority.

The annual working deficit, which the White Paper ignores after a brief mention, could be largely eliminated by the economies resulting from the introduction of integrated railway services and the adoption of an attractive and realistic tapering scale of fares.

Yours faithfully,

D. TAYLOR

Stone House,
Ivinghoe,
Leighton Buzzard, Beds.

January 22

SIR, Mr. F. E. Lamond states in his letter in your January 20 issue that the " general principles [of the British Railways modernisation plan]—dieselisation preceding electrification . . . could not be bettered . . . " I suggest that a few moves by the British Transport Commission have been so generally disastrous, so lacking in any concrete result, or have played so completely into the hands of the Minister of Transport.

Your correspondent speaks of frequent journeys on the Continent. He must know what has happened in France and Italy, where steam has given and is still giving way step by step to electrification even where this has meant replacing coal by oil. He must be aware that the Southern Region, probably the best-operated of British Railways, ran a most effective steam service to and from the Kent Coast. This was replaced by an equally effective and trouble-free (bad riding excepted) electric service, in one case 18 months ahead of schedule.

Compare that with the London Midland Region. In this part of England we seem to have run wild and spent a fortune ; so much so that it looks as though the whole modernisation scheme is in danger. What have we to show for it ? Thirty-five miles of relatively unimportant electrified line 200 miles from Westminster with a hopeful promise that a similar length will be ready in another year's time. It should have been obvious, particularly from the psychological point of view, that what was needed for electrification was just that : an electrified show-piece to which the authorities could point when doubts were raised.

Instead of introducing diesel traction and re-signalling and re-aligning and re-building the line, the job should have been tackled by concentrating every man and every pound on converting the Euston-Rugby section, using rigid-frame locomotives if need by, keeping down the top speed to 80 or 90 m.p.h., but, above all, building into the machines the highest possible power. Steam locomotives, oil burning if necessary, would have served, and the number would have been reduced drastically, as on the Continent, as each section was changed over.

The objections to this are nothing against that of seeing the L.M. Region main line, perhaps the most heavily-trafficked in Europe, condemned to be worked by Type " 4 " diesel locomotives.

Yours faithfully,

L. IRVINE-BROWN

Ivydene, Tilston,
Malpas, Cheshire

The Scrap Heap

Pilfered puffer

Over 28 miles of track and past five hundred signals and notices, a tank engine was driven from Wolverhampton to Droitwich by person, or persons, unknown, recently. The engine was stopped at Droitwich and backed on to a loop, to allow an express freight train through. The driver went into the signalbox and gave his name as "Whitehouse" and his fireman's name as "Dyson," then disappeared. Police are still investigating.

Sidetracked

The 10.11 a.m. train from Beckenham Junction to Victoria pulled away from the platform, as usual, one morning recently and occupied two tracks at once. The leading bogie took the points on to the main line, but immediately afterwards the points inexplicably slipped back, and the rest of the train took the adjoining track. It was not until the train had travelled for about 150 yd. that the driver realised something was wrong and stopped the train. Nobody was hurt and no damage was done to the train, but the cause of the points failure has not yet been discovered. An enquiry is to be held.

Unfair to mat makers

"Fares" for unauthorised rail trips have gone up too much, according to a mat maker of no fixed address. In court last week, the man objected to a fine of £5 or one month imprisonment for travelling the 88 miles between Preston and Carlisle without paying his fare. "It just doesn't make sense to me," he said. "The last time I got all the way from London to Edinburgh (373 miles) and it only cost me a £4 fine."

A bulky gift

The Victorian Government Railways of Australia has given a 35-ton Puffing Billy locomotive to Lord Mayor's (of Melbourne) camp at Portsea as a Christmas present. The locomotive, No. 3 NA, was built in 1900 and was taken out of service in 1955, having completed 337,000 miles of running. On November 15 it was carried by road on an Australian Army low-loader from Newport Workshops.

The "Half-crown Railway"

The rise, fall, and second rising of the Londonderry & Lough Swilly Railway Co. provide an interesting example of how affairs taken at the flood may lead on to fortune. Mr. J. W. Whyte, General Manager and Secretary for the past 30 years, joined the organisation as a youngster in the heyday of trains before the first Great War . . . The early 'twenties was a time when the division of Ireland between Ulster and what was then called the Free State made for considerable difficulty. Whilst everything from the area naturally converged on Londonderry, only about a fifth of the system lay in the Northern Ireland territory. Because part of the undertaking lay in a Province owing allegiance to the British Crown, and the remainder didn't, it was at one time facetiously known as the "Half-crown Railway." For some years after the first war, Mr. Whyte was telling me a few days ago, the company was subsidised by both Irish Governments. The L. & L.S. had already entered into road transport before the 1933 rail strike sealed its fate. At that time the company decided to go all out for conversion to motors but, because of the 1939-45 War, the programme took nearly 20 years to complete. . . . Now, I gather, 300 miles of road services are felt to compare very satisfactorily with the old 100 miles of railway.—"*Bird's Eye View*," *in* "*The Commercial Motor*."

(The last rail services were replaced by buses on August 10, 1953, and the "railway" is now exclusively a motor-bus operator.—ED., *R.G.*)

So there!

A man who runs a wide variety of small businesses in and around Brough in Westmorland, recently made an offer to buy the Eden Valley line, British Railways, London Midland Region, which is threatened with closure. He contends that the line could be made into a highly profitable concern. But his offer was rejected and so was his further proposal to rent the line and run it for a year to demonstrate how traffic could be increased. His final comment was: "I can only draw the conclusion that they are afraid to give me the opportunity."

Diogenes of the railway works

Last summer an employee at one of British Railways' Carriage & Wagon Works gave in his notice because he seldom had any work to do, and felt that he was not honestly earning his wage. His altruism appears to have been no less remarkable than the hedonism of his workmates who, according to a report in the *Daily Telegraph*, "went and sat in tubs all day long . . . Nobody bothered . . . so long as everybody could have a nice soft time."

When a bloke wants to earn honest wages,
It's sad to have nothing to do,
And corruption creeps in by slow stages
When "money for jam" is the view;
But you'll surely agree that it's shocking,
And the sort of behaviour that rubs,
When your workmates don't care about clocking,
And sit all day long in their tubs.

CHRISTCHURCH STATION

Frontage of the original station at Christchurch, New Zealand Railways, about 1890
(*see article on page* 135)

OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

INDIA

Improvements at Madras Central

Three new platforms have been brought into use at Madras Central, Southern Railway. Their completion enables suburban trains previously diverted to Rayapuram, because of major works in progress at the Central Station, to be dealt with at the latter terminus.

Udaipur-Himmatnagar line

The Western Railway is to build a line, 137 miles long, from Udaipur to Himmatnagar. The railway will afford a direct connection between Udaipur and Ahmedabad link Southern Rajasthan with Gujarat, and help to develop the Advasi tracks of those States.

NEW ZEALAND

Diesel traction

Mr. A. T. Gandell, General Manager, New Zealand Government Railways, in a statement made recently at New Plymouth, said that the world tendency today was for diesel locomotives to be used rather than railcars. As the diesel fleet increased, it would be possible to use more for passenger trains. He said that the response to the new diesel daylight Wellington-Auckland express was being watched closely and it was better than expected. It was not intended to scrap the railcars. They had given good service but it was proposed to re-engine them. It was proposed to maintain the railcars in first-class order and to supplement them in peak seasons with passenger trains such as were run on the main trunk line.

VICTORIA

Long-welded rails

Each week a special train loaded with 360 welded rails, each 90 ft. long, is leaving Melbourne for standard-gauge track laying. Special flat wagons designed for this traffic carry sufficient rails for three miles of track per train. To ensure continuity of work a stockpile of rails has been built up in Melbourne. Between Seymour and Wodonga, 95 per cent of earthworks and 50 per cent of the ballasting has been completed, while between Broadmeadows and Seymour earthworks and ballasting are progressing.

EAST AFRICA

Opening of deep water berths

The Kipevu project, a £4 million investment that will vastly increase the capacity of the port of Mombasa, is being officially opened today by Sir Patrick Renison, the Governor of Kenya, and Sir Frederick Crawford, the Governor of Uganda. The Kipevu project now coming into service comprises a causeway, linking the Island with the mainland by rail and a roadway, and four new berths. Two of the berths have been provided with transit sheds, marshalling yards, stacking yards and cranes, and the remaining two berths will be left in an unfinished state and kept in reserve for future port development.

POLAND

Level-crossing collision

A train collided with a lorry at a level-crossing near Krakow, Poland, on January 12. The occupants of the lorry were miners, four of whom were killed and eight seriously injured.

SWITZERLAND

New Basle avoiding line

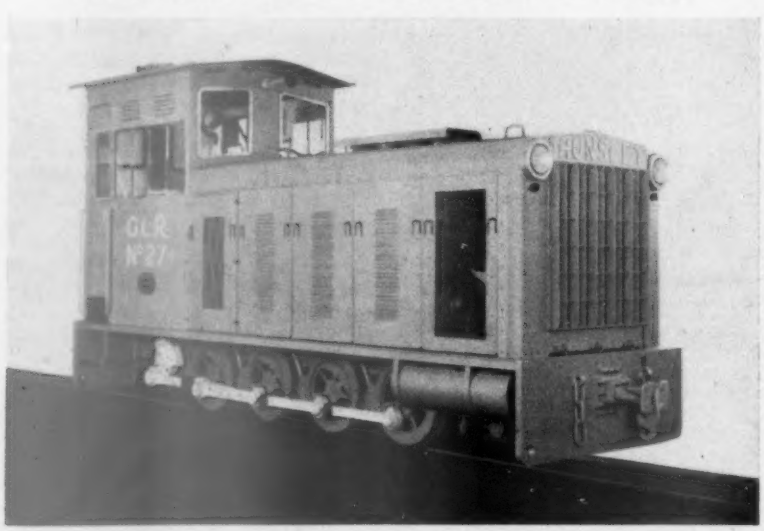
The recently-opened line linking the German Badischer station at Basle with the marshalling yards at Muttenz, on the main line from Basle to Zurich and Olten, next summer is to be used by a regular passenger service, which for the first time will avoid the reversal otherwise necessary in the main Swiss station. The train concerned is the " Riviera Express," with through sleeping cars and coaches from Copenhagen, Amsterdam, Cologne and Frankfort to Milan, Genoa and Ventimiglia. This is one of the night expresses with no publicly booked stop between Basle and Bellinzona, which avoids reversal in Lucerne also by taking the eastern spur at Olten and proceeding through Aarau, Wohlen and Rotkreuz to Arth-Goldau on the Gotthard line.

ITALY

Abolition of steam haulage in South

Early in 1962 all lines in the South now worked by steam will be diesel-operated The sections are : Bari-Brindisi - Lecce ; Bari - Taranto - Metaponto ; Catanzaro - Reggio ; Brindisi-Taranto - Metaponto - Potenza - Battipaglia ; Sibari - Cosenza ; and Catanzaro - S. Eufemia. Steam locomotives are to be replaced by diesels now under construction by Italian builders.

LIGHT-WEIGHT DIESEL LOCOMOTIVES FOR SUDAN



Hunslet 0-8-0 *diesel locomotive of the type on order for the Sudan Gezira Board*
(*see reference on page* 145)

RUSSIAN 3,000-H.P. DIESEL-ELECTRIC LOCOMOTIVE

Haulage of 1,000-ton trains at 50 m.p.h. up gradients of 1-in-110 and 650-ton trains at 90 m.p.h. on level

FOLLOWING the production of the 3,000-h.p. Co-Co diesel-electric locomotive by the Kharkov Locomotive Works described and illustrated in our issue for May 29, 1959, a further experimental locomotive of the same type and output, but of vastly different design, has been turned out by the Kolomna diesel locomotive works.

Locomotive characteristics

This locomotive, now undergoing running-in trials between Leningrad and Moscow, has already handled 600-ton trains at 90 m.p.h. Designated TEP 60, it is designed for a maximum speed of 87·5 m.p.h. It weighs 126·8-tons, and carries 6·4 tons of fuel, 1·56 tons of lubricating oil, and 1·2 tons of water. Motive power is furnished by a 16-cylinder, 11D45 two-stroke turbo-charged engine, cylinder bore and strike at 230 and 300 m.m. respectively, maximum and minimum engine speed being limited to 750 and 400 r.p.m. Specific fuel consumption is 165 + 5 gr. per h.p./hr. The engine has a cast crankshaft with a pendulum-type torsional vibration damper. Fuel is supplied by two eight-section pumps. Combustion air supply is maintained by two exhaust turbo-chargers connected in parallel followed by a second-stage centrifugal blower mechanically driven from engine crankshaft. Coolant flow is maintained by two centrifugal pumps.

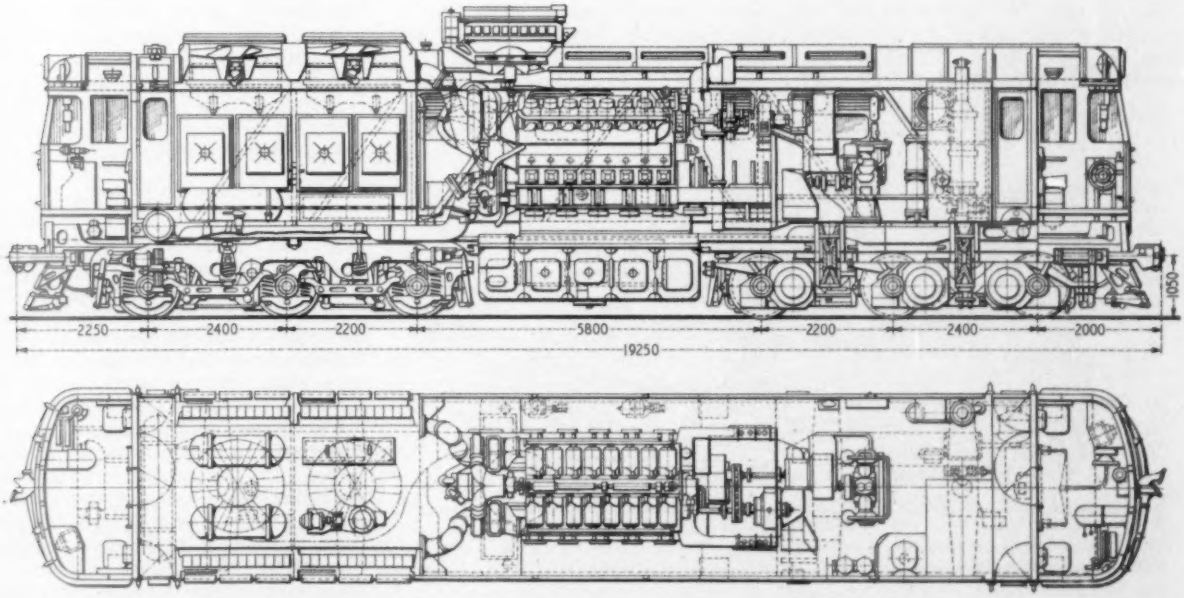
The engine cooling system comprises 24 water-cooler sections, and an equal number of novel twin sections is devoted to the engine oil. Each cooler assembly is combined in a single compartment served by individual fan. If results obtained with the new oil-to-air coolers are inadequate, it is proposed to replace these by oil-to-water heat exchangers, maximum oil temperature being limited to 195 deg. F. The cooling fans are driven with the aid of a thermostatically-controlled hydrostatic drive incorporating drive with which the hydraulic fan-drive motor is by-passed as long as the engine coolant temperature does not exceed about 150 deg. F., while, at a temperature of 170 deg. F., the fans will be cut in to run at full speed. Between the two temperature limits, fan drive will smoothly accelerate fan speed from zero to the maximum value of 1,075 r.p.m. Radiator shutters are controlled with the aid of hydraulically-operated pistons, shutters being closed as soon as fan drive is cut off. At an ambient air temperature of 87 deg. F., fan drive works at its normal output, while, at a temperature of 104 deg. F., drive is subjected to a 75 per cent overload. Ambient temperatures of this order are experienced for some 30 days annually on Central Asian lines. Overall efficiency of the hydraulic fan drive is about 85 to 86 per cent. The charge of air from the blowers is cooled in a water heat exchanger mounted horizontally on the roof of the locomotive. Cooling air is aspirated from the engine compartment and forced through the heat exchanger by a separate fan.

Directly-coupled generator

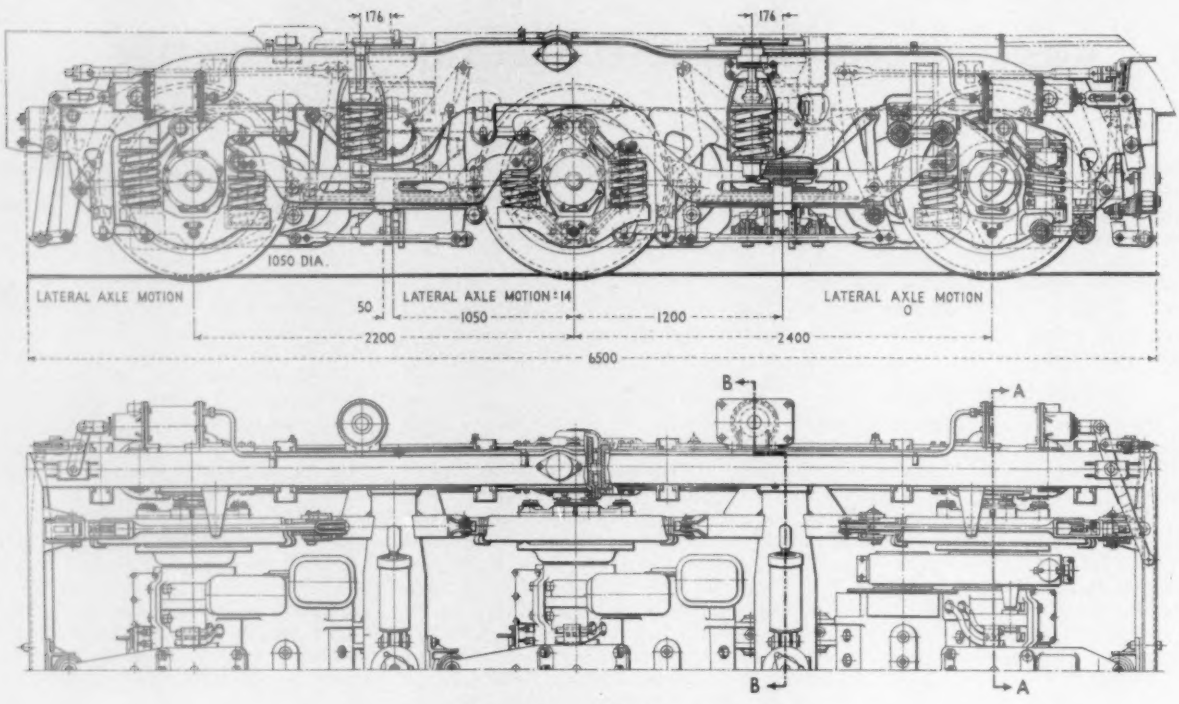
The engine is directly coupled to an MPG-120/55A 10-pole generator developing 2,000 kW. at 475/600 V. and 4,200/3,080 A. The generator is force-ventilated with the aid of a mechanically-driven blower coupled to the generator, cooling air being aspirated from the engine compartment. Generator insulation is of the silicon variety.

The generator feeds six AD-101 four-pole force-ventilated traction motors, each developing 310 kW. at a maximum speed of 1,640 r.p.m. Provision is made for two weak-field steps of 55 and 35 per cent respectively. The motors are fully-sprung, being mounted in the bogie frame and driving the wheels via Alsthom floating ring-drives.

The all-welded single shell body incorporates an underframe with two central



Principal dimensions and layout of equipment in diesel locomotive TEP60

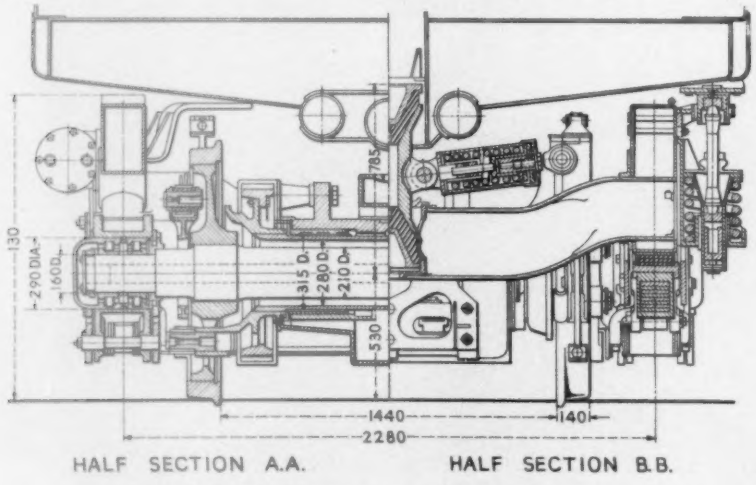


General view and longitudinal section of bogie

tubes running from end to end and thus providing continuous connection between the automatic couplers. These tubes are 194 mm. in dia. with 7 mm. wall thickness. Side walls are carried by 250-mm. high box-section members. Fuel tanks are fabricated integrally with the underframe and are thus used to stiffen the engine and generator bedplate supporting the power plant with the aid of 20 rubber pads: eight under the generator, and 12 under the engine. The batteries are accommodated in recesses at the sides of the fuel tanks. The vertical side wall members are welded to the underframe, the roof being arranged to facilitate removal of the power plant by the provision of three detachable covers.

Cab and roof sheeting is in 1·5 to 3-mm. steel sheets, while 3 mm. aluminium sheets are used for the locomotive sides. To improve noise and draught suppression, entry to the cab is *via* engine or radiator compartments.

The design of the bogies is based on designs previously evolved in Russia for Class "N60 Co-Co" electric locomotives and in France for Class "F Co-Co" locomotives supplied for the 25-kV. 50-cycle lines of the Russian railways. While the former design was influenced by Alsthom practice, the latter were directly supplied by the Alsthom Company. The bogie of the "TEP 60" diesel-electric locomotive closely follows Alsthom practice. Thus, the axleboxes are attached to the frame by links carried in rubber bushes, securing positive axle guidance at minimum possibility of wear, this in turn being conducive to reduction of flange-wear. The middle axle is allowed to move laterally to 14 mm. each side of the centre by use of axlebox roller-bearing permitting lateral axle motion. The bogie frame incorporating box-section longitudinal and tubular cross members is supported at the outer ends *via* helical springs. Between axles, it is supported also *via* half-elliptic springs carried inside the equaliser beams.

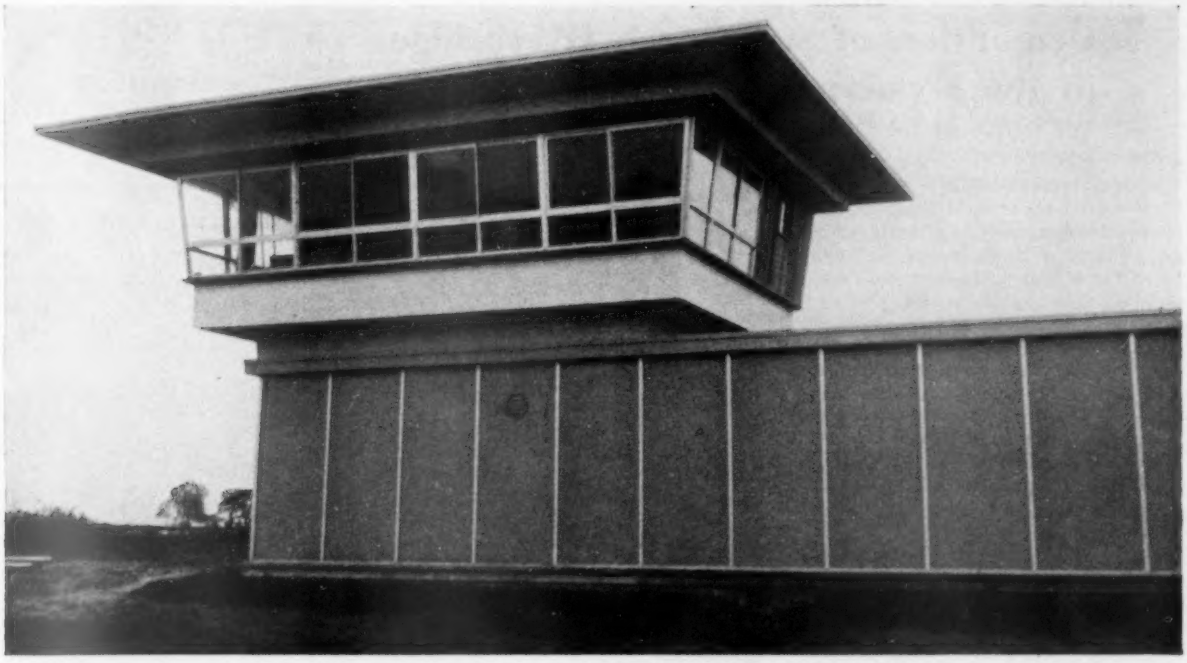


Cross section of the bogie and half of the axle

Body-weight support

The main body weight is supported on each bogie *via* two double rubber-cone assemblies, this again reducing the number of components likely to wear, at the same time also reducing the tendency of the bogie to hunt, because the two core assemblies are tilted in opposite directions when the bogie rotates relative to the body. The tubular housing provided between upper and lower cone is secured laterally to the bogie frame by spring-loaded rods, the springs being initially pre-tensioned to 1·5 tons. The purpose of this arrangement is to ensure smooth running through curves and a body-swaying frequency which is reduced as lateral displacement increases, this mak-

Continued on page 133



New signalbox at Tollerton, British Railways, North Eastern Region

NEW POWER SIGNALBOX for North East Main Line

Further stage of modernisation following the recent quadrupling of track between Alne and Pilmoor

BRITISH RAILWAYS, North Eastern Region, opened a new signalbox at Tollerton, last weekend. Ten miles north of York, the new box controls 12 miles of the Kings Cross—Edinburgh main line, marking a further local stage of modernisation following the recent quadrupling of track between Alne and Pilmoor. Colour-light signals have been installed throughout the whole area controlled from the box and are worked automatically by electrical rail circuits operated by the trains themselves. The signals can be controlled from the signalbox when it is necessary to divert a train from one line to another.

The signalbox is a bold modern structure. The design is one selected as a result of an architectural competition held by the North Eastern Region. The control room, with wide observation windows on three sides, projects outwards from a long narrow base housing the relay room. The windows are inclined at 8½ deg. from the vertical to prevent reflections and are sheltered from the weather by a flat overhanging roof.

Inside is a control desk on which is mounted a track diagram with switches and light indications to give the signalman the necessary control and information as to the position of the trains. The signal switches are of the route-setting type whereby one movement sets all the respective points and clears the signal.

Approaching Tollerton from the York direction for 6½ miles and from the Thirsk direction for 5½ miles, a series of automatic colour-light signals, spaced at approximately ¾ mile apart, control the traffic, and the progress of a train can be followed over these sections of line by light indications.

A telephone is installed at all signals remote from the signalbox to enable the crews of trains halted by signals to communicate with the signalman. All relays in the new installation are of the plug-in type.

The scheme has been planned and executed by the Chief Signal & Telecommunications Engineer and the Chief Civil Engineer of the North Eastern Region, York.

Russian 3000- h.p. diesel-electric locomotive

Concluded from page 132

ing for a stable ride, while the geometry of the suspension aims at reducing the lateral displacement at roof level—a feature of particular advantage at the pantograph level of electric locomotives. Part of the body weight is carried by the four sprung-rod supports to ensure steady ride of both bogie and body, the former as far as hunting and the latter as far as rolling is concerned.

Total static spring deflection is 93 mm., appreciably higher than previously used with Russian diesel locomotives. This, combined with the use of helical springs and the general configuration of the Alsthom design, should ensure satisfactory riding characteristics. Clasp brakes operated by four-brake cylinders per bogie are used, and it is of interest to note that push-rods are relied on to apply the blocks at the middle axle.

It might be mentioned that, in the case of "N60" locomotives built at Novocherkask and operating on the Krasnoiarsk Railway, considerable alarm was caused by fractures of the body-supporting centre pins, particularly because, when running through curves, it would be possible for the bogie to run from under the locomotive. This component is being strengthened.

MATERIALS HANDLING CONFERENCE

The second international conference of the Institute of Materials Handling is to be held at the Prince of Wales Hotel, Southport on May 10-12, 1961. As at the previous conference in 1959, handling problems are being considered under four main activities: agriculture and food production, extractive minerals and chemical industry, heavy industry, and light industries.

Demolition of Stone-Arch Overbridge in the Western Region

Arch ring demolished with explosives in 9-hr. occupation for replacement by pre-stressed concrete deck

About 2½ miles north of Wrexham, the Shrewsbury-Chester main line of British Railways, Western Region, is crossed by an unclassified road known as Pandy Lane. The railway at this point is on what was originally a gradient of 1 in 82 and the lane was carried over it on a segmental stone arch bridge, built in 1848. The line here had been liable to mining subsidence and in consequence has been lifted progressively until the clearance under the bridge had reached the permissible minimum. Further lifting had steepened the gradient locally to an extent that heavy goods trains had stalled at this point.

Design of replacement bridge

Consequently, and although the bridge was undamaged by the subsidence, it was decided to replace the arch with a deck of pre-stressed concrete beams designed so that the entire superstructure could be lifted to suit lifting of the track in the event of further subsidence. The abutments were retained intact but the 18-in. thick arch had to be demolished with a minimum occupation of the tracks.

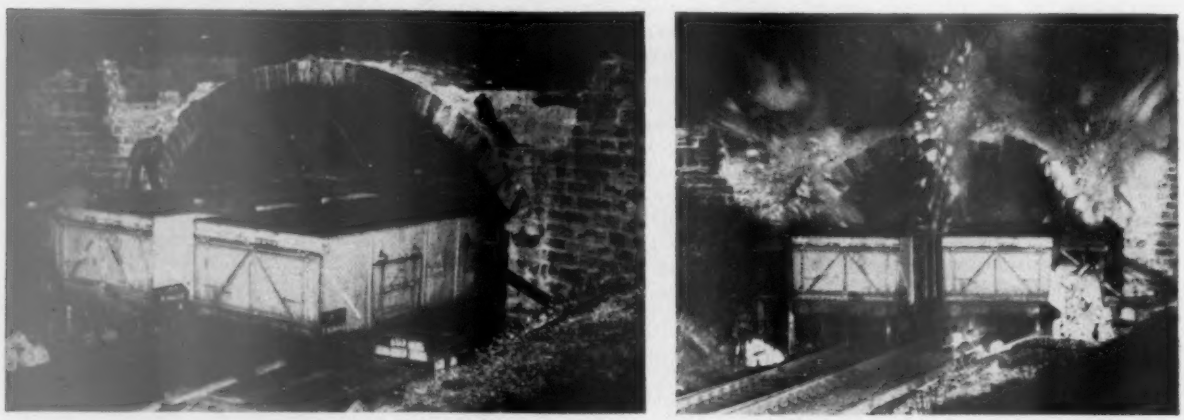
Although there were occupied houses within 100 ft. of the bridge on both sides of the line it was considered that explosives could safely be used to demolish the arching after preparatory removal of the spandrels and roadway without interference with rail traffic. Single-lane road traffic was provided for as long as possible, after which a footbridge was installed temporarily.

A specialist firm of contractors was employed to prepare the arch ring and masonry backing for demolition, some 26 lb. of gelignite being used mainly in three rows of holes drilled from above. When all was ready overhead, both tracks were occupied and two 21-ton steel mineral wagons were placed on each track under the bridge, with a solid timber platform between the wagon sides and between the wagon sides and the abutments; the sleepers used for this had been previously prepared and some were also used to protect the floors of the four wagons.

Pandy Lane bridge prepared for demolition with temporary footbridge

The explosion caused 90 per cent of the masonry above springing level to fall either on to the platform or into the wagons, and the remaining 10 per cent of the loose stone was subsequently and easily removed and loaded into the wagons. The largest pieces of masonry could be handled by two men, but some were placed in the outer ends of the wagons by a crane, which was also used to replace the footbridge.

The whole demolition including the placing and subsequent removal of the wagons was carried out within a 9-hr. occupation, though single-line working could, if necessary, have been restored after six hr. The total weight of masonry removed during the occupation was about 90 tons.



Left: arch bared and sleeper platforms being placed on and in mineral wagons, and, right, shots being fired to demolish arch

CHRISTCHURCH STATION reconstruction

Station design influenced by railway architecture in Canada and the United States

Frontage of Christchurch Station from Moorhouse Avenue

PLANS for a new railway station at Christchurch, New Zealand Government Railways, were prepared in 1938, but because of the outbreak of war in the following year industrial operations overseas were disturbed to such an extent that supplies of many building materials, such as iron and steel, were seriously restricted. As a result the new station project suffered severely. Because of the time that had elapsed since the original plans had been prepared, the Government decided in 1953 to send two senior railway officers abroad to study the latest trends in railway station architecture and yard layout. These two officers visited the United States and Canada, and saw the most modern railway terminals in each country. Their investigations resulted in several alterations being made to the plans for the new station. To enable an early start to be made with the erection of the main building it was decided to carry out the work in two stages. The first included foundations and basement for the main block and the east wing, and the second, erection of the main block, the east wing, and the west wing.

Main building

The total frontage of the new station is 523 ft. 8 in. on the ground floor and 403 ft. 8 in. on the first floor. The central portion, four stories in height, has a frontage of 203 ft. 8 in. The highest part of the building is the 106 ft. clock tower, in which are set four clocks, each with a face 7 ft. 6 in. in dia. The total floor area is 80,000 sq. ft.

As the new building is about midway between two important streets, Manchester and Madras, it was deemed desirable to have two main entrances to

Left : ticket counter in the booking hall, and, right, bookstall on main platform at Christchurch Station

Passengers' restaurant at Christchurch Station

the station portion with subsidiary entrances to the offices and other parts. These entrances go through to the platforms and each gives access to the booking hall. Because the platform level is higher than the street level, there are steps at the entrances. On each side of the portals is accommodation for the porters and police. Entrance is made by three pairs of double doors into the entrance lobbies, which are lined with polished marble. The ceilings are finished with acoustic tiles. Each lobby has telephone booths and there are recesses for coin-in-the-slot lockers where a passenger can deposit his suitcase and lock it up for such time as he desires.

Dining room

On the left-hand side of the eastern entrance is a large dining room. Finished with a marble dado and acoustic ceiling, it is heated and mechanically ventilated. The end and the side walls nearer the platform are mainly glass, and there are two wide windows looking on to the entrance lobby. There are two entrances, one from the platform and the other from the booking hall. Half of one wall has the service compartment fitted up with counter, hot plates, and tray racks, arranged to give quick service.

A large kitchen adjoins the dining room. The pastrycook's department, with the necessary cooking equipment, is at one end, together with a sandwich room and a wash-up compartment. The floors of the kitchen quarters are tiled in red floor tiles. The various rooms are mechanically ventilated. Further east are the kitchen stores, cool rooms, kitchen-staff dining rooms, and toilets. A separate entrance is provided from the street for the delivery of stores, which can, when necessary, be taken down to the basement bulk stores by lift.

Staff quarters

At the extreme eastern end are the quarters for the guards and porters. They have all the usual amenities, including a lunch room, pay office, ambulance room and traffic laundry. The entrance to the staff quarters is direct from the platforms. Here, also, is situated the coaching foreman's office and the public address system.

The booking hall is on the right-hand side of the east entrance hall, approached by four sets of double doors. This hall is 100 ft. long, 44 ft. wide, and has a height of 22 ft. 6 in. Between the doors is a wide window, at the foot of which is a flower box. This means that practically the whole of the end of the booking hall is glass.

Booking hall

The booking hall is the main feature of the station and is finished in polished marble to a height of 13 ft. Above the marble are plaster panels and on the long sides of the lobby there are 14 coloured photographic murals extending up to the ceiling. These murals, each of which is 8 ft. 6 in. deep and 8 ft. 1 in. wide, depict various scenic and tourist resorts in the South Island. The ceiling is covered with acoustic tiles with inset electric lighting panels.

The floor of the booking hall is covered with terrazzo and in the centre is a map of the South Island showing the railway routes. This floor is heated by hot water pipes buried in the concrete, and the radiated heat from the floor warms the whole hall. For the convenience of the travelling public a green pilot light is displayed. This serves as a meeting point for travelling parties and others.

The booking hall is mechanically ventilated and lighted by windows at each end above the entrance doors. On the right-hand side of the hall is the ticket office. The design of this office is a new departure from former railway practice, as there are no ticket cubicles, but instead a long, continuous counter over which tickets are sold. This is in accordance with modern Canadian and American design.

The left-hand side of the booking hall is largely in glass. On this side are show cases, the entrance to the women's section, windows to the women's waiting room, and the post office. The women's waiting room and the post office also open on to the platforms. In this area are placed the free luggage room, the

Main platform viewed from station yard, showing station building, before reconstruction, in background

women's toilets, and the stairs leading to the men's toilets in the basement.

Special treatment has been given to the women's waiting room, which has plywood-panelled walls and an acoustic-tile ceiling. At the end of the room is a pram store and a staircase to the first-floor retiring-room devoted to the use of women passengers. At the head of the stairs is the rest room which has an electric fireplace and mantelpiece. This room is furnished as a lounge with comfortable chairs. At the end are two cubicles where mothers can feed babies in privacy. Opening off the staircase is a small toilet room in which are facilities for mothers to wash their babies.

On the ground floor, the western entrance hall is the same in all respects as the eastern entrance hall. On the right-hand side are the luggage, parcels, and mail areas which take up most of this wing. Six doorways, for inward and outward luggage and parcels, are protected from the weather by cantilever verandahs, as are the main entrances to the station and the entrances to the kitchen and basement.

Post office counter at the station

Shops and offices

Between the luggage department and the platforms, and opening on to the platforms, are the book and fruit stalls, the pillow store, and the barbers' shop. This barbers' shop has three chairs for hair-cutting and shaving, and three bathrooms. Adjoining are offices for the chief stationmaster and other staff.

The main platform is 1,820 ft. long and there is a dock platform at each end to accommodate suburban trains and railcars when the main platform is occupied. About 70 passenger trains and railcars are dealt with daily.

There is a large basement. Here are located a large bicycle store, kitchen store, boiler room, refuse room, air-conditioning machine room, carpenters' and electricians' rooms, various stores, the men's toilets (with a separate approach from the platform), sub-station battery room, and luggage-viewing room.

Access to upper floors

There are two entrances to the upper floors, one on each side of the main entrances to the station. Staircase and lifts provide access to the upper floors. On the eastern side of the first floor are the rooms and offices of the District Mechanical Engineer and members of the Goods Manager's staff. In the centre are the transport licensing staff, the typists, staff clerks, and the claims office. At the back of this central block are the accountants' office, refreshment branch offices, telegram room, tele-printers, and telephone exchange. The whole of the western wing is occupied by the District Traffic Manager and his staff.

On the second floor are the District Engineer's offices, containing a large drawing office, partly south-lighted from the roof, plan-printing room, records, and clerical offices. The second floor also accommodates the signal cabin, signal and telephone equipment rooms, machine-accounting section, and various other offices. The signal cabin projects from the rear wall of the station building, giving the signalmen a clear view of the platforms and the yard. The top floor extends only over the front of the central block and contains the staff cafeteria and kitchen, the staff lounge, and a conference room and office for the use of the General Manager when he visits Christchurch.

Main entrance hall, showing doors on left to the booking hall and doors ahead leading to Moorhouse Avenue

Construction of building

The building is constructed with a steel frame, reinforced concrete floors, and reinforced brickwork for the exterior walls. The interior walls to corridors and toilets are also brickwork, but the dividing walls to the office floors consist of demountable timber units so designed that the panels can be re-used in any future alterations that may be necessary.

The finish to the interior has been studied to give the minimum amount of maintenance. All public spaces are lined with either marble or tiles and the floors are paved with terrazzo. The toilets have tiled walls and floors and the kitchen quarters have red quarry floor tiles throughout. The walls of the station building at platform level have the lower

part finished in tiles with bands of tiles showing Maori motifs as decorations. The waiting rooms, and staff social rooms on the top floor, have plywood panelling.

Bronze fittings

The entrance doors and frames to the building and ticket lobby, also all the windows, doors and fittings, for these compartments, are finished in bronze. The remainder of the interior is finished in plaster with hard plaster dadoes painted in pastel shades.

All rooms of importance have false ceilings and those rooms where machines are used have the ceilings covered with acoustic tiles. The exterior of the building is finished with a blue-stone base to the street frontages, with face bricks above, pointed in white. The piers between the windows are blue terra-cotta, the steel windows painted white, and the plaster finished in off-white. The flat roofs are covered with asphalt protected from the heat by flat asbestos tiles. The building is heated by hot-water radiators except for portions already mentioned.

The architects for the building were Messrs. Gray Young, Morton, Calder & Fowler, of Wellington, with Messrs. Manson, Seward & Stanton of Christchurch as supervising architects. Construction was by Wilkins & Davies Construction Co. Ltd.

British Railways Type "4" Diesel-Hydraulic Locomotives

North British-M.A.N. engines and Voith, N.B.L. transmissions incorporated in Swindon design vehicles

THE FIRST batch of British Railways Type "4" diesel-hydraulic locomotives based on the Swindon built Type "4" locomotives, but fitted with N.B.L./M.A.N. engines and Voith/N.B.L. Type "LT306r" transmissions, are now operating in the Western Region. These locomotives, 33 of which have been ordered, are being built by the North British Locomotive Co. Ltd., Glasgow. Weighing 79·5 tons in working order, the maximum service speed is 90 m.p.h. and the starting tractive effort at 30 per cent adhesion is 53,420 lb.

Power units

The serial numbers are D833 to D865 inclusive. The 12-cylinder power units, type NBL-MAN L12V 18/21S each develop 1,100 h.p. at 1,530 r.p.m. The pre-heating system installed on the Swindon-built locomotives for the Maybach engines is not required with these units. Each of the Serck cooling groups incorporate the Serck/Behr hydrostatic fan drive and automatic temperature control system.

Lightweight construction

The superstructure, underframe, and running gear are generally similar to the Swindon locomotives which employ a lightweight stressed skin construction, integral with a tubular member underframe.

The four-wheel bogies are of the Krauss-Maffei pivotless type, fitted with large diameter S.K.F. self-aligning bearings. For train heating a Stone-Vapor oil-fired boiler of 2,000 lb. steam per hr. capacity is installed. Controls are arranged for multiple-unit working with the Swindon-built Type "4" and the N.B.L. built Type "2" locomotives.

The NBL/MAN engine recently passed the 100-hr. British standard type test B.S.2593 (1958). This included frequent periods of running at the intermittent traction rating of 1,200 h.p. The fuel consumption figures recorded throughout the test were 0·378 lb/b.h.p./hr. at 1,100 b.h.p. and 0·380 lb./b.h.p./hr. at 1,200 b.h.p.

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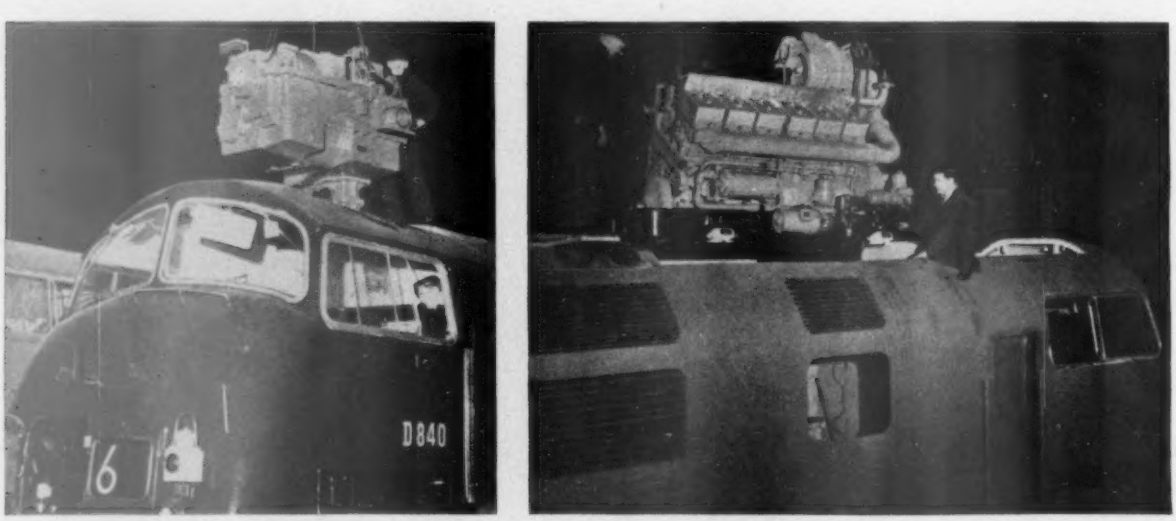

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Elsewhere in this issue we make references to the re-organisation of the management executive which is in course of progress on Rhodesia Railways. Illustrated biographies of the principal officers concerned are included in this section.

MR. L. A. W. HAWKINS, F.C.A., C.A.(S.R.), ASSOC.INST.T., Principal Executive Officer (Technical) Rhodesia Railways, who has been appointed Assistant General Manager (Operations) Designate, joined the railway

service as Assistant Chief Accountant in 1946. Previously, he had been a junior partner in a well-known firm of chartered accountants at Southampton and Portsmouth. In the recent war (during which he was stationed for a period in Rhodesia) he served with the R.A.F. and attained the rank of Squadron Leader. Mr. Hawkins was appointed Chief Accounts & Finance Officer in 1950. In this capacity he visited England and America in 1953, in connection with loan negotiations with the International Bank, and, the following year, returned to this country for technical discussions regarding the Foreign Operations Administration Loan. He became Principal Executive Officer (Technical) in March, 1956.

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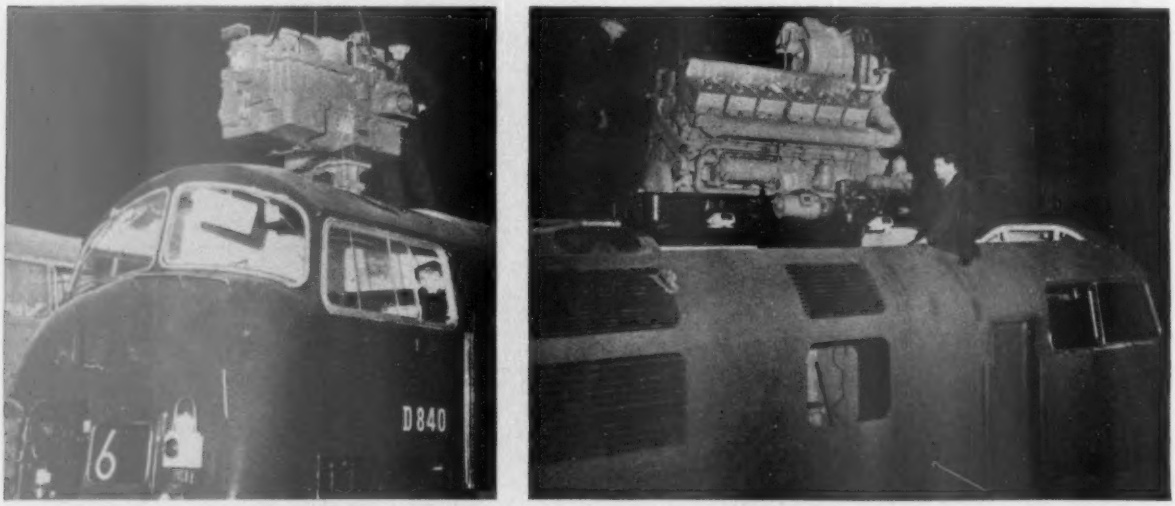

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to the position of Programme & Statistical Officer, the position he now relinquishes.

MR. A. H. CROXTON, Principal Executive Officer (Movement), Rhodesia Railways, who becomes Principal Executive Officer (Special Duties), was educated at Colet Court and St. Paul's School. He began his career with the London & North Western Railway in 1919 and, joined Rhodesia Railways in 1927, becoming Assistant Operating Superintendent, Bulawayo, in 1946. In 1947

he became Acting Operating Superintendent. He was promoted to be District Superintendent, Bulawayo, in 1949 and later served at Broken Hill and Salisbury. In 1953 he was appointed to the new position of Rhodesia Railways Representative in Northern Rhodesia, and was stationed at Lusaka until returning to Bulawayo as Deputy Chief Superintendent in July, 1954, and later becoming Principal Executive Officer (Movement).

MR. E. A. CORDELL, B.A. (SOCIAL SCIENCE), A.M.INST.T., Chief Officer, African Affairs, Rhodesia Railways, who has been appointed

Manager, Personnel Division Designate, joined that system in 1946 as Assistant Chief Officer shortly after the formation of the African Affairs Department. He was a lecturer in law and natural languages with the British South African Police from 1932 until his appointment as Native Welfare Officer to the Salisbury (S.R.) Municipality in 1937. During the war he served with the First Battalion, Rhodesian African Rifels as Company Commander and later as District Commissioner under the British Military Administration in Somaliland. After the war he resumed his position with the Salisbury Municipality and early in 1946 was promoted to Chief Clerk & Adviser on African Affairs. He became Chief Officer of that Department later the same year.

MR. CYRIL STANTON ROBERTSON, O.B.E., Assistant Chief Superintendent of Transportation, Rhodesia Railways, who is Regional Manager Designate, Salisbury, was born at Komgha, Cape Province, in 1904. He joined Rhodesia Railways, in January, 1920. Thereafter, he served at Selukwe, Sinoia, Salisbury, and Umvuma until he became Stationmaster at Matetsi, in January, 1929. From 1932 to 1940 he was Stationmaster at Luanshya. He was transferred to Nkana in 1941, to Ndola in 1944, and to Bulawayo, in 1945. He acted as Assistant Operating Superintendent in

various District Offices from 1947 to 1948, and was confirmed in this position at Salisbury. Mr. Robertson was appointed District Superintendent of Transportation, Bulawayo, in 1953, and was transferred to Salisbury in 1954. He became Assistant Chief Superintendent of Transportation in February, 1959. That part of the system to be under his management is from the Portuguese border near Umtali to Gwelo.

MR. TREVOR ARNOLD WRIGHT, C.A.(S.R.) A.C.I.S., Chief Accounts & Finance Officer, Rhodesia Railways (top right), Regional Manager Designate, Bulawayo, was born in 1917 at Bulawayo. He joined Rhodesia Railways in 1933. After returning from military service Mr. Wright was granted leave from June, 1946, to the end of November, 1948, to be articled to a firm of Chartered Accountants. On December 1, 1948, he was appointed Accounts Assistant (General) and took over the duties of Assistant Chief Accounts & Finance Officer in 1951, which position he held until his appointment as Chief Accounts & Finance Officer in March, 1956. That part of the system to be under his management is from Gwelo to Thomson Junction and to Mahalapy in Bechuanaland; it also includes that part of the Lourenco Marques line within Southern Rhodesia.

MR. KENNETH MACKENZIE MACDONALD, Assistant Chief Commercial Manager, Rhodesia Railways (below), Regional Manager Designate, Broken Hill, was born in Glasgow in 1906. He served with the Highland and L.M.S. Railways before joining Rhodesia Railways in 1926. He became Commercial Superintendent in May, 1956, and Assistant Chief Commercial Manager in August, 1959. That part of the system to be under his management is from Thomson Junction in Southern Rhodesia northwards and includes the whole of the system in Northern Rhodesia. The region comprises the present Transportation Districts of Livingstone and Broken Hill.

NEW EQUIPMENT *and Processes*

RAIL CRANE

The lifting capacity of the rail crane illustrated on this page is 20 tons at 10 ft. rad using the standard 30-ft. jib, and a shunting capacity of 150 tons is quoted for the normal chassis designed for this duty. A permanent way chassis, allowing the crane to travel in train, is also offered.

The standard power unit is a Perkins "Four 270D" diesel engine and transmission to the various crane motions is of the direct mechanical type, pneumatically operated controls ensuring finger-tip precision in handling all loads.

The crane shown has been equipped with a 54-in. dia. electro-magnet to enable it to handle scrap, pig iron and other ferrous materials. In this instance, a separate generator for the magnet has been fitted, this being mounted on the left-hand side of the slewing superstructure : alternatively, smaller-capacity magnet equipment, using a generator powered by the crane's own engine, can be supplied. Disconnection of the magnet to allow the crane to be used for general lifting duties is quick and simple.

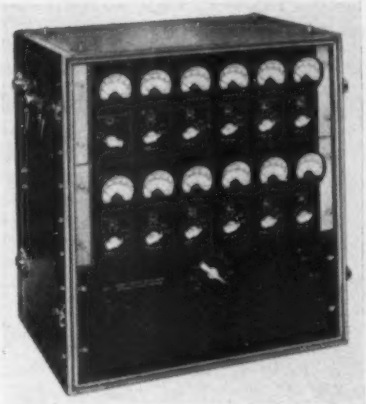
Further details can be obtained from the manufacturer, K. & L. Steelfounders & Engineers Limited, whose associates, George Cohen Sons & Co. Ltd., act as sole U.K. distributors of the complete range of Jones Cranes.

VERSATILE OFFICE BLOCK

When Bristol Commercial Vehicles Limited had to move its service stores department to a temporary site it was faced with the problem of office accommodation for the staff. The office would be required for about 18 months only, after which it would have to be abandoned —unless it could go with the company when this moved out again.

To meet the problem, Dexion Limited designed a two-tier installation comprising a 30-ft. x 12-ft. block constructed of slotted angle and sheet steel, with chipboard flooring, ceiling, and stair treads. It can be readily dismantled and reassembled as it is, or to a number of other designs.

Further details can be obtained from the manufacturer, Dexion Limited, Maygrove Road, London, N.W.6.



HARMONIC ANALYSER

A portable battery-operated harmonic analyser has been built for the British Transport Commission to British Post Office electrical design. It has given highly satisfactory service while in use during the recent system tests on the 50-cycle electrification of the Colchester-Clacton-Walton railway line.

The analyser is used to measure the magnitude and frequency of harmonic interference from electrified traction and power distribution cables into adjacent telecommunication systems.

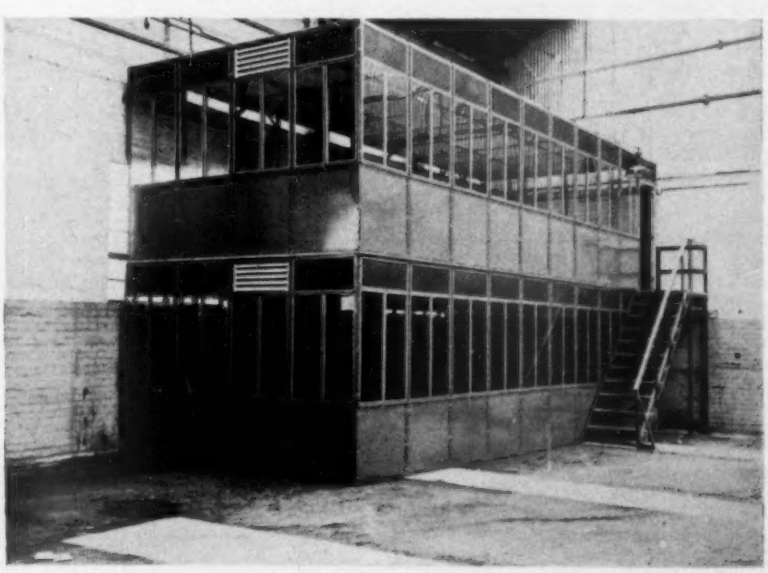
Normally, wave-form analysis is a slow and laborious process, but the instrument greatly facilitates the work, as it is arranged to measure and display selected harmonic amplitudes, continuously and simultaneously. The instrument is fitted with indicating meters, but output terminals are provided to enable the outputs to be fed through a translator for permanent record by an electronic digital recorder.

The analyser comprises an input attenuator panel for controlling the input voltage, an oscillator and calibrate panel for setting up and checking the analyser units, and 12 plug-in selective measuring units each accepting one of the following frequencies:—

50, 150, 250, 350, 450, 550, 650, 750, 950, 1150, 1350 and 1550 cycles.

Direct filtering is used to remove all but the particular harmonic of interest. Attenuators in each unit enable voltage range switching to be used.

Further details can be obtained from the Transmission Division of the Telephone Manufacturing Co. Ltd., Hollingsworth Works, Martell Road, London, S.E.21.



D

PARLIAMENTARY NOTES

Government's Final Re-appraisal of Railways

L. M. Region electrification to go on; acceptance of Commission's scheme for supplementary railway pensions

Mr. Ernest Marples, Minister of Transport, gave "new life" to the railways in a comprehensive re-appraisal speech on nationalised transport in the House of Commons on January 31.

He said the Government proposed an entirely new organisational structure, because it believed the old was outmoded and had been overtaken by events. He expressed gratitude to the Commission and to Sir Brian Robertson personally for the distinguished way in which he had presided over a wide range of activities and for the co-operative help he had always been ready to give. He was also grateful for the Commission's willingness in introducing the new scheme.

The underlying purpose was to separate the tasks and problems of operating the various nationalised transport undertakings, to define the responsibilities of management, and to provide management with clear objectives in set fields so that it could concentrate its efforts and energies. That was especially important for the railways.

Some of the undertakings needed to be conducted by a statutory authority. British Railways, London Transport, British Transport Docks, and British Transport Waterways each needed an authority with special statutory powers and duties. "Two of them for some time to come would need Exchequer assistance."

Separate Undertakings

The other activities of the Commission operated alongside similar private enterprise undertakings and were generally in competition with them. They did not call for special statutory authorities. They should depend entirely on their own commercial strength and they represented considerable and valuable public assets which ought to be used effectively for the public good and for the public purse.

To do that, they must be able to conduct their day-to-day business in exactly the same way as those commercial undertakings with which they competed. The Government proposed a commercial framework for these activities. The holding company, by its support, advice and encouragement, without intervening in management matters, would be able to ensure that the right standards of operation and financial judgment were applied.

Points as Yet Undecided

The White Paper proposals were essential first steps, but doors had been deliberately left open in some important matters. The White Paper did not set out to deal with detail, or to leave no room for consultation in the framing of the necessary legislation. Regard had been paid to the views of the particular interests concerned and the Government was prepared to do likewise in framing the necessary legislation. Account would be taken of points made in the debate and those with responsibilities in the new structure, especially the Chairmen-designate of new boards, would be consulted.

The Railways Board

Arrangements for the practical preparation of the Bill had been put in hand and there would be discussion with the Commission and trade unions. The Government aimed to give managements full opportunities to give of their best. They would have the means and tools of good management and be able to feel and bear the weight of personal responsibility for their actions.

Nowhere was a single-minded direction needed more than on the railways. There was no argument about the essential unity of British Railways. They must be run as an effective national system. The British Railways Board was to be the employer of its own workpeople. The responsibility for negotiating national wage and other agreements would rest squarely with the Board. The functions of central importance to the railways as a whole would be its prime responsibility. The Board would have particularly important responsibilities in fruitful modernisation investment and in getting the best value for money.

The art of good management, given the right tools, was to get the best response at all levels; this meant sensible and adequate devolution of authority. The man on the spot did not give of his best looking over his shoulder and having to wait on decisions relating to his own job taken at levels remote from him.

The regional railways boards would be an important new feature in the railway organisation. Unlike the present area boards, they would have a strong, full-time membership. They would be a living part of railway management and operation and translate into regional practice and operation the national railway policy. Above all, they would play a part in that national policy through their representation on the British Railways Board.

A new structure and reorganisation could do a great deal to make railway problems manageable, but of equal importance was the quality of the leaders, and the morale of staff and workers. The railways must have the best leadership available. There must be opportunities in all parts of the railways for those with ability to get to the top. At the start it might be necessary to bring in a few new people. The task was challenging, the time was crucial. The task not only covered running one of the biggest industries in the country, if not the biggest; it also involved transformation of structure, outlook, and finances. The Government must give regard to these special needs in its search for the best available talent and in considering the terms on which it could be obtained.

As the preparation for the Bill went forward, the exact composition of each board would have to be worked out with those most closely concerned, including the Chairmen-designate. In particular, para. 32 of the White Paper referred to the special contribution which could be made by those with trade union experience.

There was nothing in the proposals which should interfere with the present system of national negotiations and agreements. The Minister said he was examining points put to him at a meeting he had with the Trades Union Congress, and if other proposals were advanced he would be ready to examine them.

New Allocation of Investment

Co-ordination of investment and of operation were increasingly becoming a matter on which he must form a judgment, because of his responsibilities to Parliament and also because he must oversee a wider field and had functions beyond the nationalised transport sector alone. They included roads, and improved methods of investment allocation were being developed to meet this need. One example was the five-year rolling programme for classified roads. Another was the interest in a long-term programme for railway investment. Yet another was the interest in the operational field, as co-ordination over a wide range of activities could and should exist at different levels. Working arrangements existed between London Transport and the London lines of British Railways long before the Transport Commission came on the scene, and would be continued.

Rail and Road Co-ordination

The Minister said the railways and British Road Services were living in a competitive world dominated by neither. Both would have to consider the effects of competition from private enterprise road hauliers and from "C"-licence vehicles. Where co-ordination was sensible, the White Paper provided for it.

Problems of co-ordination would arise and would need to be referred to the Nationalised Transport Advisory Council. Its advice would be based on full knowledge of nationalised transport undertakings plus the wider experience available through independent members. The new structure and organisation also would provide for the usual indices of success or failure. If there were profits in one section the Exchequer would benefit as at present and would offset deficits elsewhere.

On railway finances, the Minister said the scaling-down of the capital burden must be properly related to the effective contribution which the assets they represented could make to the railways' financial recovery. Those assets would be in the hands of the Railways Board. That was one of the ways in which it differed from the old Railway Executive. It would foster financial discipline, and provides the set task and clear objectives for which the new structure was designed.

The total capital liability of the Transport Commission was £2,000 million, of which £400 million have been written off as

a bad debt, £800 million had been transferred to a suspense account as a doubtful debt, and the remaining £400 million remained as a capital liability.

The interest liabilities, although removed from the railways, would fall on the taxpayer. The Treasury would become responsible for the existing British Transport stock.

Over the next two years, even allowing for reduced interest charges, large sums would have to be provided from the Exchequer to meet current deficits. The object was to place the railways in a position where they would have a real hope of achieving solvency and the resolution to attain it. There should be known targets, which management and men should set out to attain. This problem was being tackled. There had already been discussion with the Commission regarding the provision necessary during 1961 to cover the overall deficit. The Minister had the Chancellor's agreement to inform the House that a figure of £103 million had been agreed for this. Parliament would be asked to authorise the necessary expenditure from the Vote.

After taking into account certain non-recurring items, the provision for 1961 was a reduction of £13 million in the railways' operating loss. Mr. Marples hoped the House would take this as an earnest of what was still to come.

Higher Pensions for Older Superannuitants

The Minister stated that the Commission, which had proposed supplementation for railway pensions, had now put forward to the Ministry a scheme for supplementing certain pensions particularly those of the older superannuitant whose sole pension was that provided by the railways. This scheme, which appeared to hold the balance between relieving hardship and adding materially to the Commission's financial problems, would involve additional expenditure which would have to be taken into account in considering the future financial position of the railways. He had agreed that the Commission should proceed with the scheme on that basis.

The total additional cost in the first full year was expected to be £650,000. The Commission expected to be able to find the necessary sum from within the proposed Estimate of £103 million for 1961-62, and it would shortly announce the details of the scheme.

Mr. Marples then spoke of commercial freedom and fares and charges policy.

The railways were to be given as free a hand as possible to conduct their commercial operations on a commercial basis. Today, only in the London Passenger Transport area, where London Transport and British Railways together hold a virtual monopoly, will it be necessary to have a statutory control of fares. Elsewhere the railways would be free to fix their own fares. The public ought to know that railway fares and charges had not kept entirely in line with the general price level. Parliament must support the railways when they pursued a realistic and purposeful fares policy.

The Government was considering whether coastal shipping restrictions should be removed.

There must be a purposeful slimming of the railways; the matter was being studied in relation to transport 10 years hence—road and air developments and what would be the complete effect when there was a complete network.

Railway services at present uneconomic might well become more profitable as modernisation and rationalisation proceeded, and there were uneconomic services which raised questions of social need. In the end, these would be a matter for the Government to decide in the general context of transport.

Appeal to Trade Unions

The Commission had now made a firmer estimate than ever before of the result of electrification. The Government had decided that the London-Midland main-line electrification Euston to Crewe, Manchester, and Liverpool, should go ahead as quickly as was consistent with the best use of resources. Government approval of this electrification scheme did not mean that other major main-line electrification works would necessarily be approved, but it should be taken as evidence of the Government's faith not only in modernisation, but in the British electrical manufacturing industry.

Mr. Marples concluded that the whole country would be anxiously watching the progress of the railways over the next few years to see how far productivity could be increased.

The British Railways Productivity Council had made progress, but it still had a very long way to go. . . . There must be a reasonable and effective deployment of railway workers. The railway trade unions had a special responsibility and a great opportunity to help. Over a vast organisation like British Railways, small savings could produce considerable results. The Government and the taxpayer were contributing their share, but without matching contribution from within the industry this could not avail.

The Government intended to introduce the necessary Bill to implement the White Paper's proposals during next session.

A Spate of Criticism

Mr. G. R. Strauss (Vauxhall—Lab.) moved an amendment to the Government's motion seeking approval of the White Paper welcoming the financial relief given to railways, but regretting a scheme of reorganisation "that will further disintegrate the publicly-owned transport undertaking." He said the Government was still too optimistic in thinking that, in five years' time, the railways would be able to pay their way. In West Germany and France steps had been taken to free the railways of road competition; here it was unrestricted. What could full-time members of regional boards do except get in the way of General Managers? Since they came into power 10 years ago, the Government had never been able to desist from interfering with the operations of the British Transport Commission.

Mr. Aubrey Jones (Hall Green, Birmingham—C.), former Minister of Supply, said that no organisation in a state of thraldom to the Minister of Transport could be efficient. He regretted that the recommendations of the Stedeford Group had not been published. The manpower of the railways had to contract, possibly by as much as 20 per cent. Under the new arrangements, it would be extremely difficult to bring about any cross-fertilisation of experience between road and rail. It was most important that people of road experience should play a part in railway operations. The Government's proposals made this more difficult. The most effective way of wasting money was to spin out development over some time.

Mr. Ernest Popplewell (Newcastle upon Tyne—Lab.) said the White Paper could be called "for whom the bell tolls" for the British Transport Commission, and he hoped that the Government would think again. He tore up a copy of the White Paper, saying the debate was a complete failure of Government policy. The Government should consider the problem as one of road, rail, inland shipping, air, and coastwise shipping.

Mr. Geoffrey Wilson (Truro—C.) welcomed the White Paper because "it introduced an atmosphere of reality into our transport debates which has been absent far too long." Planning took a great deal longer here than in Europe or America because of the British temperament.

Mr. T. Steele (Dumbartonshire W.—Lab.) was surprised to hear the Minister say the Government was looking 10 years ahead, but the White Paper only pushed the problem five years ahead.

Sir Toby Low (Blackpool N.—C.), who had been chairman of the Select Committee on the Nationalised Industries, welcomed the Railways Board, because "we shall now have single-minded direction of the railways." Success could only be achieved by the vigorous use of every instrument of management and of science known to man, and if we face some of the very difficult and inconvenient problems still involved in getting the railway system right.

More University Staff Needed

Mr. Francis Noel-Baker (Swindon—Lab.) said that, after a talk last week with the head of the French National Railway Company, he wondered why this country made such heavy weather over its railway difficulties. France had begun nationalisation in 1937 and had produced a first-class system by heavy expenditure on nationalisation. There was no real determination to spend similar amounts of money on the railways here. Neither the management in Swindon nor the Commission had the faintest idea of what was to happen in 1962 about railway workshops, for instance. It was humiliating to see the condition of our railways when one had been to countries like France, Italy, Germany, or Sweden, where they had been through all similar railway problems and solved them many years ago.

Colonel C. G. Lancaster (South Fylde—C.) regretted the House had not the knowledge of what the Stedeford Committee recommended, and regarded it as an error, which had not been committed in the mining industry, that the railways had not more higher education and university men to play their part in railway management. Also, it seemed regrettable that time and motion study on the railways had been done on only a very limited scale.

Mr. Frank McLeavy (Bradford East—Lab.) said the Government should set up a National Transport Board to make a survey of existing transport facilities and keep the Government informed as to the best ways of obtaining a cheap and integrated national service. It would take two years before the White Paper proposals could take effect,

and meanwhile there would be stagnation. There was a strong case for the legal enforcement of traffic on the railways, in view of successful practices abroad.

Mr. John Peyton (Yeovil—C.), who did not like nationalisation in any case, complained that there was no indication of the Government's intentions regarding the size of the railways or their eventual role. Had there been any change of heart on the part of anyone who would take part in the running of the railways which would entitle anyone to suppose that the Government's proposals carried the seed of hope ? Was there any hope for better or more effective union co-operation ?

Time and Motion Study

Mr. C. Mapp (Oldham East—Lab.), referring to time and motion study, said the operations of the railways were not like a belt system in a factory. Railway carryings were not so bad as the House might be led to believe. Railway operations depended mainly on the character and good will of the railway servant. There were many operations where the bonus system could be applied. The White Paper was a face-saving operation on the part of the Minister.

Mr. John Howard (Test, Southampton—C.) said he did not accept the point, implicit in the White Paper, that if the taxpayer remitted the debts of the railways, the remission of those debts should be the means of permitting the railways to expand their scope for unfair competition with coastal shipping.

Mr. James Callaghan (Cardiff S.E.—Lab.) asked if 1964 was still the date for the completion of the electrification on the London Midland Region, and cited the Victoria underground extension to Essex as a project which would be a social instead of an economic test.

Mr. John Hay, Joint Parliamentary Secretary, Ministry of Transport, said that the latest position was that it was hoped to complete the London Midland electrification in 1966. For the first time, the reconstruction of Euston Station was included, and it had been assumed that work on the whole scheme could proceed at the optimum rate at which the Commission could do it having regard to the resources available. The reception which the White Paper received in the House had been mixed, but the fact was that there had been a good many misunderstandings about what it said. There were matters referred to in the White Paper on which final decisions had still to be made. The B.T.C. and the Government had sought practical answers to practical problems. At the present stage, the White Paper could only be a sketch-plan. Nevertheless, it gave the House and the country a pretty clear idea of the way in which the Government would like to go. As to the Bill to implement the proposals, there was a great deal of drafting to be done, and a large number of interests would have to be consulted. The main contribution to meeting the target for the railways was by modernisation. The Minister of Transport was not anti-railway, but he was a taxpayer, and that was something which should commend itself to the House. He appealed to the House to approve the White Paper in its broad outline and so institute a new deal which he believed was long overdue in our nationalised transport industry.

Approval was given by 303 votes to 221.

Staff & Labour Matters

Railwaymen's Wages

At a meeting on Thursday, January 26, leaders of the three railway trade unions, the N.U.R., T.S.S.A., and A.S.L.E. & F., decided to defer the presentation of a new wage claim to the British Transport Commission pending a decision being given by the Commission on the unions' claim for a shorter working week which is due to be considered at a meeting of the Railway Staff National Council on February 17.

In reaching their decision the unions had in mind that the Railway Pay Committee of Inquiry (the Guillebaud Committee), when assessing the railwaymen's position in comparison with outside industry, took into account the fact that railwaymen worked a 44-hr. standard week while workers in many other industries had a 42-hr. week. It is understood that T.S.S.A. and A.S.L.E. & F. took the view that, if railwaymen's hours were reduced to 42 a week, the basis of comparison with other industries would be changed and any new wage claim would require to be related to the new position. If the claim for a shorter working week were rejected, arguments in support of a wage claim could be based directly on comparisons with wage movements in outside industry.

It is also understood that T.S.S.A. is very anxious that the valuable principle established by the Guillebaud Committee of appropriate differentials between grades and the relationship between pay scales for comparable work on the railways and elsewhere should not be upset, which might be the case if all railway workers were to be given the same increase.

Telephone facilities for Indian Royal train

The Western Railway of India on January 22-23 conveyed the Queen and the Duke of Edinburgh by metre-gauge line from Jaipur to Sawai Madhopur, 82 miles. The Royal party entrained at 10.30 p.m. and the special train arrived at Sawai Madhopur shortly before 2 a.m. Breakfast was served before detrainment at 9.30 a.m. The train, double-headed, consisted of the President of India's saloon, occupied by the Queen and Prince Philip, six air-conditioned carriages for the Royal party, a dining car, General Manager's saloon, and accommodation for other railway staff.

As there was no corridor communication between vehicles, the Western Railway Signal Department provided automatic telephone facilities. A 25-line automatic exchange, supplied by Indian Telephone Industries at Bangalore, was used. It was given a continuous vibration test on a static bench, and then in a special coach attached to an express between Ahmedabad and Delhi. The exchange, weighing 250 lb., was fixed to a heavy metal base laid on anti-vibration rubber mountings. Despite oscillation and shunting movements the equipment did not fail, although on one occasion a jolt threw two desk-type telephones from a table. For the special train the exchange was installed in a four-berth compartment. Power was supplied from a 50-V. battery with a stand-by. Twenty-one telephones were provided throughout the train including three in the Royal coach. They were connected to P.V.C. multi-core cable running throughout the train.

Separate communication was provided between the locomotives and the guard, using Laryngophone equipment, stated to be particularly suitable for the footplate where there is a high noise level which the ordinary telephone would transmit.

Marshalling yard at Kingmoor Carlisle

The opening of the road viaduct across the Southern entrance to the marshalling yard being built at Kingmoor, Carlisle, British Railways, London Midland Region, will cut out a busy railway level crossing and shorten the average time of the journey to and from Carlisle by as much as 10 min.

More important from the point of view of contractors and British Railways' engineers building the yard itself is the fact that the opening of the road and bridge has left the way clear for intensive work on the site after a winter of heavy rain. The drainage of the site has been completed; the laying of slag infill is under way and making very good progress and now the preparations are being made for the permanent way and signalling contractors to move in.

The slag infill is being brought from a disused ironworks site at Cleator Moor and is now being laid at the rate of some 100 wagon loads a day, or about 2,000 tons. This is regarded as " maximum production " and the plan of campaign is to spread the slag over the excavated ground and thus prepare a hard-core bottom for the bottom ballasting, which will require 200,000 tons of another type of slag from Scotland. Ballasting starts this month, and Whatlings Limited, the contractor for the work, is introducing a ballast compactor of German design to do the job. A tracked machine, it compacts the slag ballast by a series of mechanically operated hammers which pound the material on which it is working.

The laying of some 56 miles of running lines and sidings will be started at the beginning of March. This £250,000 contract is scheduled for completion in 48 weeks. The up departure group of sidings will be dealt with first and from there the works will progress to the local sidings and the down departure group of sidings. The " king " points at the apex of the shunting humps at each end of the yard will be made of manganese steel. After the track laying will come the laying of the top stone ballast.

There should be a start soon with the preliminary work for the signalling system in and around the yard. A new power-operated signal box at Kingmoor will eventually lead to the closing of signalboxes at Etterby Junction, Kingmoor, Rockliffe and Floriston, and there will be power signalling on the main lines between Carlisle and Gretna Junction as well as in the marshalling yard itself. Five relay rooms are to be built for this system. The signal contractor, Westinghouse Brake & Signal Co. Ltd., is already setting up its depot at Etterby and the first job will be the routing of the various power cable lines between Longtown and Canal Junction. The signalling and control system will be based on the new power box and two control towers.

CONTRACTS AND TENDERS

Diesel locomotives and wagons for the Sudan Gezira Board

The Hunslet Engine Co. Ltd. has received a further order from the Sudan Gezira Board for 18 135-h.p. 0-8-0 type diesel-mechanical locomotives required for the Managil extension. This is the sixth repeat order received from the Sudan Gezira Board, for Hunslet locomotives specially designed for its cotton plantation narrow-gauge railway system. The Hunslet 17¼-ton eight-wheel locomotives are powered by Gardner diesel engines. Transmission is through a Hunslet multi-plate friction clutch and a flexible coupling to a Hunslet constant-mesh gearbox giving four speeds of 5, 8¾, 14¼ and 20 m.p.h. in either direction of travel. Maximum tractive effort at site is 8,620 lb.

An order valued at some £300,000 has been placed with Robert Hudson Limited, by the Sudan Gezira Board for the supply of closed goods wagons, brake vans, tank wagons and rubber-tyre low loader trailers. The equipment is required for the Sudan Managil extension scheme.

South African Railways has placed an order with International Computers & Tabulators Limited for three electronic computers of the I.C.T. 1200 series. The capital value of the total order is some £200,000.

British Railways, London Midland Region, has placed the following contracts :—

Evelyn Williams & Co. Ltd. : staff association club building at Birkenhead

Braithwaite Foundations & Construction Limited : construction of bored piles for bridge No. 21 over the proposed Queensferry By-pass on the Chester-Holyhead line

Leonard Fairclough Limited : lowering through Liverpool line tunnels in connection with Liverpool-Crewe electrification

L. Walton (Builders) Limited : joint commercial service and telephone inquiry bureau at Birmingham Suffolk Street offices

T. T. Chapman Limited : improvements to Staff Association buildings at Skipton

William Mitchell Limited : construction of offices, sub-station building, battery charging station and workshop building at Herdman Channel, Belfast.

British Railways, Southern Region, has placed the following contracts:—

Arthur Scull & Son Ltd.: installation of heating and hot water supply in new platform buildings, extension of electrification, Chatham Station

Matthew T. Shaw & Co. Ltd.: new signal structures, Kent Coast colour-light signalling, Hither Green to Dover

Demolition & Construction Co. Ltd.: new staff accommodation, extension of electrification, Dover Marine

Sydney Antill & Company: strengthening of platforms at Tulse Hill Station

H. N. Edwards & Partners Ltd : station renovations, Overton

Maurice Hill Limited: repairs, Ore Carriage Shed

Aubrey Watson Limited: provision of new drainage, Rochester Station

J. T. Mackley & Co. Ltd.: piling to slip, Salfords

W. R. Payne & Sons Ltd.: painting of bridges, Ashford District

Wilson Lovatt & Son Ltd.: part reconstruction of Commercial Pier, Weymouth Harbour

R. Mansell Limited: repairs to offices, Waterloo Station

Butterley Co. Ltd.: reconstruction of Abbey Street Bridge, London Bridge

Durable Asphalte Co. Ltd.: new roadway, Gomshall

Turnerised Roofing Co. Ltd.: waterproofing of roofs, Lancing Carriage Works.

British Railways, Scottish Region, has placed the following contracts :—

J. Campbell & Sons : building work at Inverness

Fraser & Borthwick Limited : electric power and lighting for diesel maintenance facilities, Eastfield motive power depot, Glasgow

Mechans Limited : four 50,000 gal. oil storage tanks for diesel maintenance facilities, Eastfield motive power depot, Glasgow

West's Piling & Construction Co. Ltd.: piling and foundations for office block, Sighthill new goods depot, Glasgow

Jas. White (Contractors) Limited : Site works at overbridges, Nos. 16, 44 and 155, Kinbuck, Gleneagles and Burrelton, earthworks, drainage and fencing for rail connection to B.M.C. factory, Bathgate, and site works at overbridges, Nos. 52, 54 and 81, Polmont and Greenhill

Webster, Bannerman & Co. Ltd. : reconstruction of overbridge No. 4, Maxwell Road, between Eglinton Street and Pollokshields East Stations

P. & W. MacLellan Limited : footbridges and Williamwood, Whitecraigs, Patterton and Neilston High Stations.

British Railways, North Eastern Region, has placed the following contracts:—

Steels Engineering Products Limited: supply of one six-ton road mobile crane for the District Engineer, Darlington

Mitchell Construction Co. Ltd.: excavation of sludge from sewage beds and drainage works at Healey Mills marshalling yard

N. G. Bailey & Co Ltd : electrical installation work at Bradford Valley goods depot

Brightside Heating & Engineering Co. Ltd.: installation of heating and hot and cold water in the yardmaster's office at Newport marshalling yard

J. R. Deacon Limited: erection of a single-storey prefabricated building in the old station at York for the Chief Civil Engineer's Department

W. E. Hargrave Limited: hot water heating installation at York motive power depot

Quibell & Son, Ltd.: erection of the second stage of the new office building at Paragon Station, Hull

Plasser & Theurer: supply of five Plasser-Theurer ballast tamping machines, accessories, and spares

Kenyon Pumps Limited: provision of a water pumping and filtering installation in the pumping station, Scarborough Bridge, York

James Scott & Co. Ltd.: installation of electric lighting at Red Barns Sheet Factory, Newcastle

D. Crouch Limited: importing and spreading filling material, part 2 at the marshalling yard at Lamesley

Ransomes, Sims & Jefferies Limited: supply of a 25-cwt. battery road mobile slewing crane at Bradford Valley goods depot.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Pakistan :

4 air-power portable diesel-driven compressors.

The issuing authority is the Chief Controller of Stores, Eastern Bengal Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P6/C/93/60. The closing date is February 14, 1961. The Board of Trade reference is ESB/2753/61.

From Iraq :

Construction of earthwork on standard gauge railway line between Mussayeb and Diwaniyah for the Baghdad-Maquil-Um Qasir S.G. line project.

The issuing authority is the Directorate General, Iraqi Republican Railways, Ministry of Communication, Baghdad, to whom bids should be sent. The tender No. is 8. The closing date is March 5, 1961. The Board of Trade reference is ESB/2713/61.

From Sudan :

1 shaping machine.

The issuing authority is the Controller of Stores, Sudan Railways, Atbara, to whom bids should be sent. The tender No. is 2311. The closing date is March 8, 1961. The Board of Trade reference is ESB/973/61.

1 self-contained friction drop stamp.

The issuing authority is the Stores Department, Sudan Railways, Atbara, to whom bids should be sent. The tender No. is 2317. The closing date is March 20, 1961. The Board of Trade reference is ESB/969/61. No further information is available at the Board of Trade.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

NOTES AND NEWS

Philips Limited move to Glasgow. In two week-end operations, Philips Electrical Limited is, this month, moving its Scottish organisation into the company's new regional headquarters, Highland House, Glasgow.

Anglo-Tunisian trade agreement. A trade agreement with Tunisia was signed on January 1, 1961, at the Board of Trade. The agreement, valid from November 1, 1960, to October 31, 1961, provides increased possibilities for United Kingdom exports of artificial and synthetic fibre cloths, industrial refrigeration equipment, and public transport vehicles.

Hadfields in Canada. Hadfields Limited is to form a new company, operative from February 1, to control and promote the marketing of the whole of the group's products in Canada. The company, known as H.M.K. Sales, replaces Millspaugh (Canada). Hadfields' sales direction in Canada was previously conducted by Peacock Bros. The new company's headquarters will be in Montreal.

Westinghouse lecture to Southern motormen. On Wednesday, January 25, before an audience of 95 Southern Region officers and motormen, some of whom had travelled up to 60 miles to be present, Mr. B. C. Vigor of the Westinghouse Brake & Signal Co. Ltd. spoke for an hour on the dual application of automatic and electro-pneumatic brakes to the Region's 1951 stock. After his lecture, questions were invited and answered. Speaking later, Mr. G. A. Weedon, Motive Power Officer of the Southern Region, who instituted these lecture-discussion groups two years ago, pointed out that occasions of this kind were not only informative : based on matters of everyday concern to the motormen, they fostered a man's interest in his work.

Closure of Bala-Blaenau Ffestiniog (Central) freight line. The freight line between Bala and Blaenau Ffestiniog (Central) was closed on January 28 ; passenger services were withdrawn in January, last year. The stations at Frongoch, Arenig, and Blaenau Ffestiniog (Central) have been closed completely. Stations at Trawsfynydd, Maentwrog Road, Ffestiniog, and Manod will temporarily cease to be rail connected but the completion of the new rail link, with the London Midland Region at Blaenau Ffestiniog, will make possible the restoration of the service to these points. Traffic in full truck-loads for Frongoch and Arenig will be dealt with at Bala, and, in the interim period, traffic in full truck-loads for stations between Trawsfynydd (inclusive) and Blaenau Ffestiniog North will be dealt with at Dolgellan and Blaenau Ffestiniog North.

Additional premises for British Rototherm Co. Ltd. Additional factory premises in Wimbledon, S.W., have been acquired by the British Rototherm Co., Ltd., Merton Abbey, London, S.W.19. The Wimbledon works, which are in the course of being equipped, will accommodate a machine shop, dial thermometer production unit, and bulk stores.

F.B.I. delegation to Spain. Sir William McFadzean, President of the Federation of British Industries, will lead an F.B.I. delegation to Spain on February 12. The visit is in response to an invitation from the Consejo Economico Sindical Nacional, which sent a party of high level industrialists to the United Kingdom in April last year. The delegation's headquarters will be in Madrid and from there its members will visit various industries in the provinces. The delegation will discuss the opportunities for increasing Anglo-Spanish trade.

Take over bid by Turner & Newall. At the Annual General Meeting of Turner & Newall Limited held in Manchester on January 26, 1961, it was announced that the Board of British Industrial Plastics Limited had considered the offer by Turner & Newall to acquire the ordinary shares of B.I.P. and that it will recommend its acceptance by shareholders. The offer will be: for every seven ordinary shares of 2s. each of British Industrial Plastics Limited, one ordinary share of £1 of Turner & Newall Limited, and 28s. in cash.

John Brown Interim dividend. The directors of John Brown & Co. Ltd. have declared an interim ordinary dividend in respect of the year ending March 31, 1961, of 4 per cent, less tax.

New scientific instruments publication. The first number of the new *Sima Review*, which replaces the former *Sima Bulletin*, which was largely concerned with the internal matters of the Scientific Instrument Manufacturers' Association of Great Britain, has now been published. The new journal will appear twice a year and is considerably larger than its predecessor. It contains informative articles reflecting the activities and interests of the British scientific industry.

North Eastern Region, train service alterations. British Railways, North Eastern Region, has announced that the 2.50 p.m. (Saturdays excepted) diesel train from Selby to Leeds City, and intermediate stations has been retimed to depart Selby at 2.30 p.m., 20 min. earlier than at present. The train now calls at South Milford at 2.42 p.m., Micklefield at 2.49 p.m., Garforth at 2.54 p.m., Cross Gates at 3.0 p.m. and arrives Leeds City at 3.07 p.m. The 11.20 a.m. diesel train from York to Leeds City calls at Micklefield, and Cross Gates each weekday, departing Micklefield at 11.40 a.m., Cross Gates at 11.50 a.m. and arrives Leeds City Station at 11.57 a.m., 5 min. later than its previous timing.

B.R.S. Reorganisation at Luton. British Road Services has changed its organisation in the Luton area. Luton District has been abolished and responsibility for the branch and depots previously covered by that district will be split between Peterborough District and Leicester District. Bedford branch and the Bedford, Northampton, and Stevenage Depots are to be under the control of Mr. J. W. Calvert, District Manager, Peterborough. The Aylesbury, Dunstable, and Luton Depots will be under the control of Mr. R. J. A. Thody, District Manager, Leicester District.

Steel shipment in the United States. The Republic Steel Corporation recently shipped 100 tetrahedral-shape supports to the United States Air Force at Colorado Springs, Colorado. The 75-ft. long structures had to be sent on three-wagon assemblies, each made up of a flat wagon between two gondola wagons. Three of the structures were shipped on each three-wagon grouping. As many as nine assemblies were despatched on each train. The illustration on this page shows several of the structures on Chicago & North Western wagons.

New plastics company formed. The Universal Asbestos Manufacturing Co. Ltd., and Thermo Plastics Limited, a member of the Tootal Group, have formed, as equal partners, a new manufacturing company, Allied Structural Plastics Limited, with a capital of £100,000. On the board of the new company are Mr. James Morrish and Mr.

Steel structures being carried on assemblies of gondola and flat wagons on the Chicago and North Western Railway

F. R. B. Lockwood of Thermo Plastics, and Mr. D. Kirkness and Mr. P. Talbot-Smith of Universal Asbestos.

Coventry Gauge Issue price. The terms of the one-for-four rights issue of the Coventry Gauge & Tool Co. Ltd. were fixed at 16s. a share. With the share price at 25s. 6d. the "rights" were worth just over 1s. 11d. a share.

Increased R. A. Lister sales. An upward trend in the sales of R. A. Lister & Co. Ltd., is stated by the Chairman, Sir Percy Lister, to have continued last year. Some 70 per cent of the firm's products are exported directly or indirectly.

Turner & Newall bid for British Industrial Plastics. Turner & Newall Limited is to offer cash and exchange of shares to the value of £19 million, for the ordinary capital of British Industrial Plastics Limited. The terms are reported to be one ordinary Turner & Newall share plus 28s. in cash for every seven 2s. ordinary B.I.P. shares.

Permanent Way Institution Meeting. The 77th annual winter general meeting of the Permanent Way Institution was held in the theatre of the Institution of Civil Engineers, London, on January 28. The chair was taken at the outset of the meeting by the President, Mr. C. E. Dunton, Chief Civil Engineer, London Transport Executive. During the course of the meeting Mr. Dunton reminded the members that at the annual summer meeting in May, 1960, Mr. A. K. Terris, Chief Civil Engineer, British Railways, Eastern Region, had been elected as President-elect. It was now necessary, he said, to formally confirm his election as President. The proposition was unanimously agreed to by those present.

Transport Tribunal hearing. The Transport Tribunal will resume the hearing of applications to alter the British Transport Commission (Passenger) Charges Scheme, 1959, on February 13, 1961, at the Niblett Hall, 3, (North), King's Bench Walk, Temple, London, E.C.4, commencing at 11 a.m.

Rhodesia Railways Management Executive. The accompanying illustration shows the new Management Executive of the Rhodesia Railways. The members are, left to right: Messrs. E. A. Cordell, Manager, Personnel Division; L. A. W. Hawkins, Assistant General Manager (Operations); J. H. Allen, General Manager; H. J. N. Collis, Assistant General Manager (Planning Research & Co-ordination); Roy Allan, Assistant General Manager (Commercial & Accounting); K. M. MacDonald, Region Manager, Broken Hill; C. S. Robertson, Regional Manager, Salisbury; and T. A. Wright, Regional Manager, Bulawayo. Mr. A. M. Hawkins, Assistant General Manager (Engineering), whose illustrated biography appears on page 139, is absent from the group.

Cheaper Saturday night fares. Visitors to Devon and Cornwall from the Midlands, Lancashire and North-East England during the summer will be able to travel at specially reduced fares on Saturday nights. Travel will be by special train, and the reduced fares will show a 25 per cent saving on the ordinary fares. The tickets will be available for travel on the 8th or 15th day. Tickets will only be issued up to the seating capacity of each train and light refreshments will be available.

Irish Railway Clearing House Chairman. At a meeting of the committee of the Irish Railway Clearing House held in Dublin on January 25, Dr. C. S. Andrews, Chairman, Coras Iompair Eireann, was elected Chairman of the committee for the year 1961.

R.F.D. Co. Ltd. factory opened in Germany. The R.F.D. Co. Ltd. Godalming, manufacturers of dunnage bags for the protection of goods in transit, has announced that its associated company, Hanseatische Rettungsgerate Fabrik GmbH of Hamburg, has opened a new factory for the production of R.F.D. equipment in Germany.

Large moving coil meter. The world's largest moving coil meter, about 17 ft. sq., will overlook the tenth Electrical Engineers Exhibition, to be held from March 21 to 25 at Earls Court. The meter scale will be more than 20 ft. long. It will show the total electrical load connected during the exhibition. The movement and dial have been designed and constructed by Nalder Bros. & Thompson Ltd., and a special current transformer will be coupled to the main intake to Earls Court from the London Electricity Board supply.

Institute of Transport informal luncheon. Sir Miles Thomas, Chairman, Monsanto Chemicals Limited, is to be the speaker at the Informal Luncheon of the Institute of Transport to be held at the Connaught Rooms, Great Queen Street, London, W.C.2 on February 7, 1961.

Institution of Locomotive Engineers meeting. A General Meeting of the Institution of Locomotive Engineers will be held on February 21, 1961, at 5.30 p.m. in the Lecture Hall of the Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1. A paper on "The collection and assessment of technical information, including the language problem," by Miss J. Ritchie, Assistant Librarian, British Railways Research Department, London, and Mr. B. R. Bryne, Principal Scientific Officer, British Railways Research Department, Derby, will be presented and discussed.

Vac-U-Lift (Great Britain) Limited agents. From January 1, 1961, sales and service for Vac-U-Lift equipment in the London and the Home Counties has been carried out by R. A. Reddey (Mechanical Handling) Company, 300 Sandycombe Road, Richmond, Surrey, tel. Richmond 0111.

Pritchett & Gold at the Electrical Engineers Exhibition. A replica of a portion of the high-tension switch room in a British Railways sub-station of the Kent Coast electrification scheme will be the principal feature of the Pritchett & Gold & E.P.S. Co. Ltd. stand, at the Electrical Engineers Exhibition at Earls Court from March 21 to 25. The 110-V. battery which is exhibited on a three-tier double-row stand incorporates high-performance cells of the latest improved type in sealed glass boxes.

Turner and Newall to acquire Stillite Products. The board of Turner & Newall Limited has announced that arrangements have been made to acquire the whole of the share capital of Stillite Products Limited, which manufactures mineral wool products at Stillington, Co. Durham, and South Bank, Middlesbrough. The acquisition will enable Turner & Newall Limited to add to its range of insulating materials.

More parking space at Sudbury Town Station. The London Transport Executive has stated that more parking space for cars will be brought into use at Sudbury Town Piccadilly line station, on February 6. A new park for 23 cars has been laid out on a piece of land adjoining the station forecourt and, with the existing small car park in the centre of the forecourt, there will now be room for 29 cars at the station.

Newly-appointed management of Rhodesia Railways (*see editorial reference on page* 122)

Railway Stock Market

Take-over bids and rumours have featured stock markets, which otherwise presented an uncertain appearance with selling and also buying rather more in evidence, the latter having been helped by re-investment of Ford Motor pay-out money. New issues have attracted a good deal of attention, but generally caution prevailed because of conflicting views about the Budget and doubts whether export trade can improve in the near future.

Among foreign rails, Antofagasta eased after their recent improvement, the ordinary stock being 16¼, compared with 16½ a week ago, while the preference stock was also fractionally lower at 31¼. United of Havana second income stock, however, strengthened from 6 to 6¼. Costa Rica ordinary stock changed hands at 38, Brazil Railway bonds were 5 and Chilean Northern first debentures 52½. Paraguay Central prior debentures held their rise to 17½. Guayaquil & Quito assented bonds were quoted at 50½.

International of Central America shares were $19½ and the preferred stock $100½. Elsewhere, Mexican Central "A" bearer debentures gained a point at 59½.

Canadian Pacifics strengthened on balance from $40¼ to $40½. The 4 per cent preference stock eased from 58¾ to 57 at which there is a yield of 7 per cent, while the 4 per cent debentures at 58½ compared with 60 a week ago, sentiment in regard to these sterling stocks having been affected by the lower level of British Funds, which, of course, tends to govern the general trend in fixed-interest securities. White Pass shares have firmed up from $10½ to $10⅝.

Nyasaland Railways shares were 9s., and the 3½ per cent first debentures 35½. Gedaref Railway & Development 5 per cent guaranteed stock was again quoted at 96. West of India Portuguese stock remained at 114½ and Barsi Light Railway stock at 16.

Among shares of locomotive builders and engineers, Beyer Peacock 5s. shares again improved—from 7s. 1½d. a week ago to 7s. 4½d. Charles Roberts 5s. shares remained at 7s. 9d. while G. D. Peters held their rise to 17s. 6d. Birmingham Wagon were 27s., and North British Loco 6s. 9d., while Wagon Repairs 5s. shares held firm at 20s. Gloucester Wagon 10s. shares were 11s. 9d. Dowty 10s. shares failed to hold an earlier rise, but at 34s. 3d. were the same as a week ago. Pressed Steel 5s. shares have come back from 27s. 9d. to 26s. 9d., but in other directions, Leyland Motors were a steady feature at 82s. 6d. Among machine tools, Alfred Herbert came back from 60s. 3¼d. to 59s. 3d., and following the results, Asquith 5s. shares changed hands below 10s., but later rallied to 10s. 1¼d.; a week ago, they were 10s. 7½d.

In electricals, A.E.I. were well maintained at 41s. 3d. Moreover, G.E.C. at 31s. 9d. rallied after an earlier decline, the interim statement having been better than expected in the City. English Electric, however, eased from 33s. 9d. a week ago to 32s. 6d. Crompton Parkinson 5s. shares eased from 12s. 4¼d. to 12s. 1¼d. B.I. Cables gained a few pence at 57s. Moreover, in other directions, Pollard Bearing 4s. shares came back from 34s. to 33s. Ransome & Marles 5s. shares remained at 17s. 7½d. Stone-Platt held steady at 56s., Ruston & Hornsby lost a few pence at 26s. 3d., but Tube Investments moved up from 73s. 9d. to 74s. 6d. News of short time working from some companies affected steel shares, though later, there was a moderate rally because it is generally believed that despite the prospect of lower profits, dividends should be maintained for the current year.

Forthcoming Meetings

February 6 (*Mon.*). The Institute of Transport, Metropolitan Section, at 80, Portland Place, W.1, at 5.30 p.m. "The work of the Design Panel of the British Transport Commission," Mr. C. Barman.

February 6 (*Mon.*). The Institute of Transport, East Anglia Section, at the Boars Head, Norwich, at 7 p.m. Annual Dinner.

February 6 (*Mon.*). The Permanent Way Institution, London Section, at 222, Marylebone Road, N.W.1, at 6.30 p.m. Presidential Address; "Permanent Way: Its recent history and future prospects."

February 6 (*Mon.*). The Society of Engineers, in the apartments of the Geological Society, Burlington House, W.1. Presidential Address by Mr. W. E. Humphrey.

February 7 (*Tue.*). The Institute of Transport, Gloucester & Cheltenham Group, at the Royal Hotel, at 7 p.m. "Railway Modernisation," Mr. J. Powell.

February 7 (*Tue.*). The Institute of Transport, Irish Section, at the C.I.E. Club, Dublin, at 6.15 p.m. "Work study in rail transport," Mr. O. Barrett.

February 7 (*Tue.*). The Institute of Transport, Midland Section, at the Engineering Centre, Birmingham, at 6.30 p.m. "Joint consultation in Europe," Mr. A. Burrows.

February 7 (*Tue.*). The Institute of Transport, at the Connaught Rooms, Great Queen Street, W.C.2, at 12.15 p.m. Informal Luncheon.

February 8 (*Wed.*). The Institution of Railway Signal Engineers, London Section, at Savoy Place, London, W.C.2, at 6 p.m. "Experience with the British Railways standard electrification system, with particular reference to signalling and telecommunications," Mr. A. W. Woodbridge.

February 9 (*Thu.*). The London Midland Region Lecture & Debating Society, at Friends House, Euston Road, London, N.W.1. "The scientific attitude as a tool of business," Mr. H. P. Barker.

February 10 (*Fri.*). The Institute of Transport, Northern Section, at the Royal Station Hotel, Newcastle, at 7 p.m. "Rural bus services," Mr. D. S. Deacon.

February 10 (*Fri.*). The Institute of Transport, Swindon Group, at the Engineering Society's Rooms, Emlyn Square, at 7.15 p.m. "Work study in transport," Mr. J. E. P. Dobson.

OFFICIAL NOTICES

AMERICAN MINING CORPORATION requires Master Mechanic for railway operating at high altitude in Peru. Applicants should have five years apprenticeship in steam railroad shops and five years practical experience with diesel-electric traction. Age 30-40 years. Initial contract 33 months with passages paid. Starting salary U.S.$500 per month. Box 116, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

APPLICATIONS are invited from Engineering Draughtsmen to fill positions in a Company engaged in the manufacture of steel castings, forgings, engineering equipment and railway trackwork. Applicants should have had drawing office and design experience in any of the above spheres, and should also possess technical qualifications of at least the Ordinary National Certificate in Mechanical Engineering. Five-day week, pension scheme, staff dining and welfare facilities available.

Reply, stating age, experience and salary required, should be addressed to the Personnel Manager, Messrs. Hadfields Ltd., East Hecla Works, Vulcan Road, Sheffield 9.

CIVIL ENGINEERS—CORAS IOMPAIR EIREANN

APPLICATIONS are invited from Civil Engineers with some years experience of Railway Permanent Way layout design and similar work both for permanent and temporary positions. Written applications should reach the Civil Engineer, Coras Iompair Eireann, Westland Row Station, Dublin, as early as possible and in any event not later than February 18, giving the following information. Age, Qualifications, Experience and Salary expected. Permanent appointments will be pensionable and put into salary scale appropriate to experience.

MECHANICAL ENGINEER

KOWLOON-CANTON RAILWAY, HONG KONG

Qualifications. Candidates (not over 45) must be A.M.I.Mech.E. with at least six years' relevant experience in a senior post.

Duties. To be responsible for the organisation and running of the Railway Workshops including maintenance and major overhauls of diesel electric locomotives, carriages and wagons and ancillary heavy equipment.

Terms of Appointment. Pensionable or contract/gratuity. Salary range £1,650-£2,865. Free passages. Rented quarters. Generous leave.

Write Director of Recruitment, Colonial Office, London, S.W.1, giving full names, age, qualifications and experience, quoting BCD 110/51/02/D15.

ROADMASTER

ENGINEERING GRADUATE preferred; minimum of two years' engineering training essential.

Require two years' varied railroad engineering service, or five years in direct charge of track crews. Will supervise 135 men maintaining 45-mile railroad, assign work, order materials, be responsible for safety, make regular detailed inspections of roadbed and all track on main line, sidings and yards, bridges, tunnels, etc. Will make engineering calculations relating to maintenance and use of structure and equipment. Must speak Spanish. Married or single candidates acceptable.

Excellent opportunity large copper company, Chile, South America. Two year contract with transportation both ways for you and family. Basic salary $525.00 to $650.00 per month depending upon age and experience of applicant.

Box 6, *The Railway Gazette*, 33 Tothill Street, S.W.1.

GHANA CIVIL SERVICE

Applications are invited for the following vacancies: GHANA RAILWAYS AND HARBOURS ADMINISTRATION

ASSISTANT DIESEL-ELECTRIC ENGINEER. Duties: To assist the Diesel-Electric Engineer in the maintenance and repairs to diesel-electric locomotives. Qualifications: Candidates must either (*a*) hold a B.Sc.(Eng.) or other recognised Engineering degree and have at least two years post-graduate practical experience; or (*b*) being not less than 23 years of age have passed Parts I and II of the examinations of either the Institution of Mechanical Engineers or the Institution of Electrical Engineers. Salary in range £1,180-£2,080 p.a.

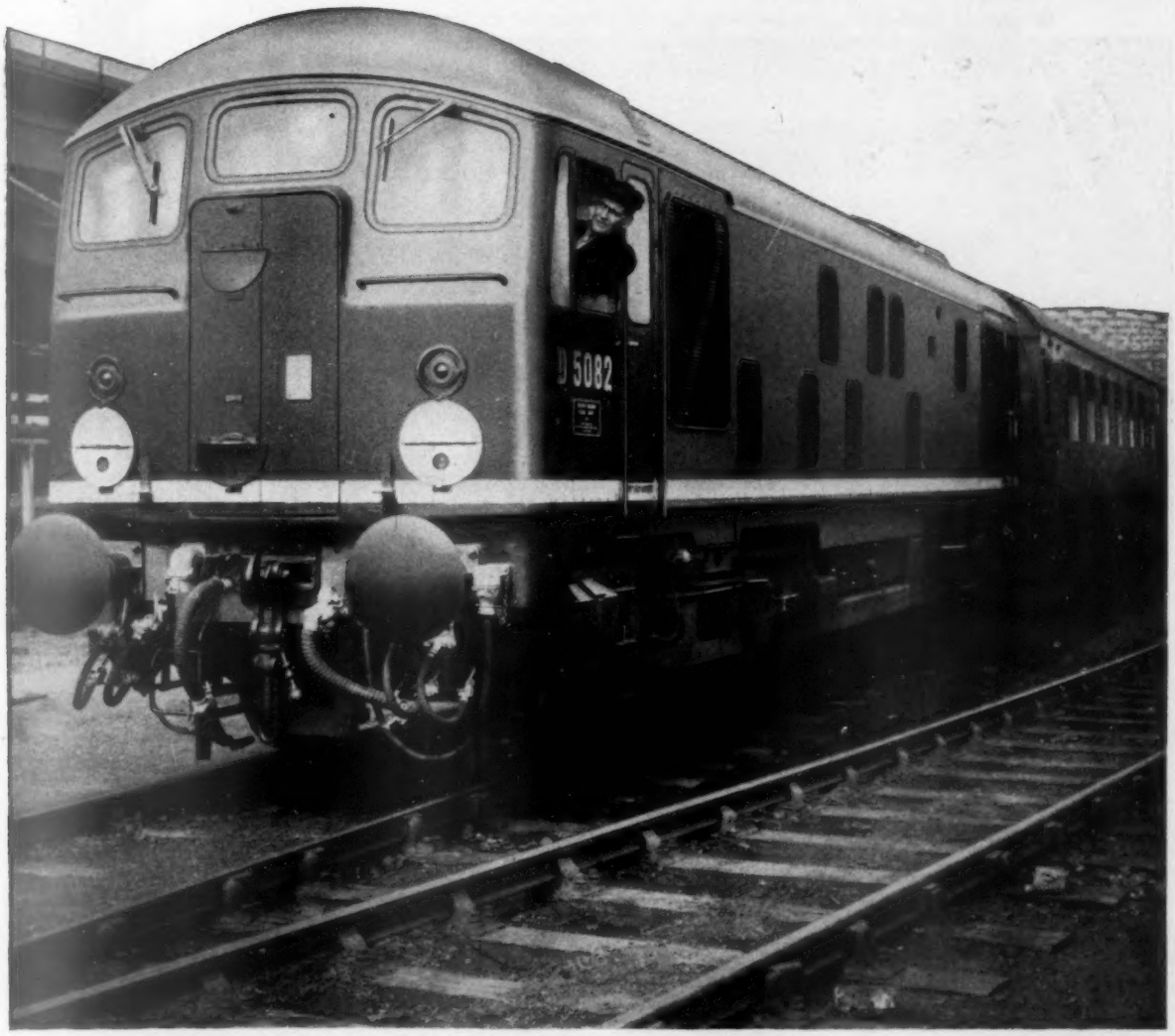
INSPECTOR OF WORKS (TEMA). Duties: To supervise and to instruct the men under his charge and generally to carry out work entrusted to him. Will be required to set out buildings, read plans, take off quantities and possess sufficient knowledge of clerical and storekeeping work to be able to control the issue and use of stores.

Qualifications: Candidates must have a good general education and must have been engaged on civil engineering work with relevant experience in a supervisory capacity for at least five years. They must have a good knowledge of heavy carpentry, reinforced concrete construction, steel-work erection and should be qualified divers to undertake and supervise under water constuction and maintenance of quays, breakwaters and general harbour works. Salary in range £1,040-1,280 p.a.

Appointments are on contract for three tours each of 15-18 months in the first instance. Gratuity £150 p.a. Free passages for officer, wife and up to three children under 18 years and in addition an education allowance for children when not resident in Ghana and attending full-time school of £100 per child for up to three children under 18 years. Interest-free advance for car and car maintenance allowance may be granted. Generous leave on full pay. Income tax at local rates. Government accommodation provided at low rental.

For application forms, please send postcard, stating post in which you are interested, to the DIRECTOR OF RECRUITMENT, GHANA HIGH COMMISSION, 248, Tottenham Court Road, London, W.1.

AEI DIESEL ELECTRIC POWER EQUIPMENTS



AEI is supplying no less than 176 power equipments incorporating Sulzer Diesel Engines for Type 2 Diesel Electric Locomotives being built by British Railways.

Enquiries to AEI Traction Division, Trafford Park, Manchester 17, or your local AEI Office

AEI **Associated Electrical Industries Ltd.**
Traction Division
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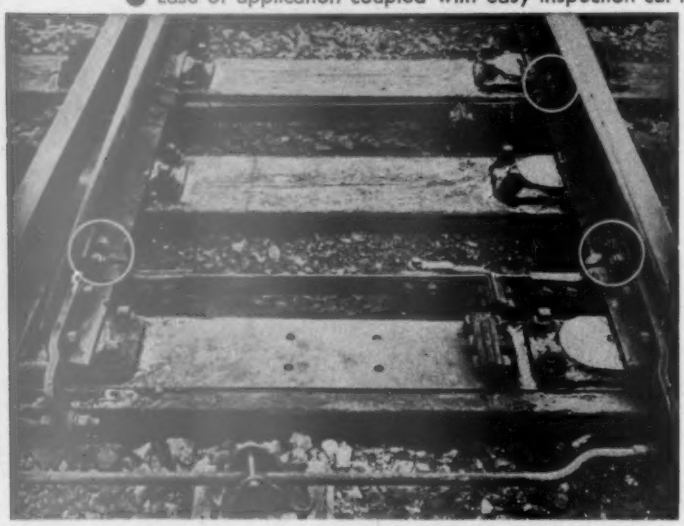
PALNUT IN SERVICE

"PALNUT" Safety Lock Washers

(Regd. Trade Mark)

● Ease of application coupled with easy inspection cut maintenance costs to a minimum. "Palnuts" function on short bolt lengths and dispense with any need for drilling for split pins and subsequent distortion of bolt thread.



By courtesy of British Railways (Western Region) we show above 'PALNUTS' fitted to the permanent way.

DID NOT FAIL!

NATIONAL PHYSICAL LABORATORY TESTED AND PROVED

- All sizes and threads available from 6BA to 2in. Whitworth.
- In Plain Steel, Cadmium and Hot Dip Galvanised finishes.
- Indispensable for all equipment subject to vibration including Conveyors, Rolling Stock, Signals, Permanent Way, Turntables, etc.

for further details apply:

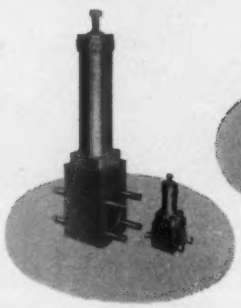
THE PALNUT COMPANY LTD.
PALNUT WORKS, 3, ARTHUR STREET, HOVE, 3, SUSSEX

Telephone: Hove 70427 *Telegrams: Palnut Hove*

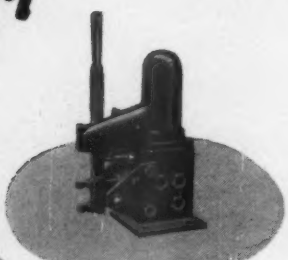
LEH DESIGNERS AND MANUFACTURERS OF HYDRAULIC EQUIPMENT

Heavy Duty HYDRAULIC VALVES

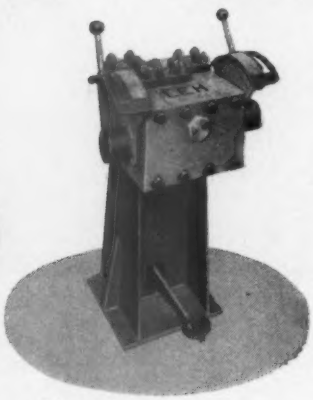
Balanced 'Inline' Stop Valve



Spring Loaded Relief Valves



Drop Mitre Control Valve With Trip Gear



Piston Type Control Valve

Drop Mitre Control Valve

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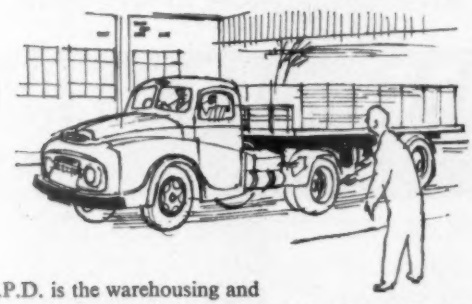

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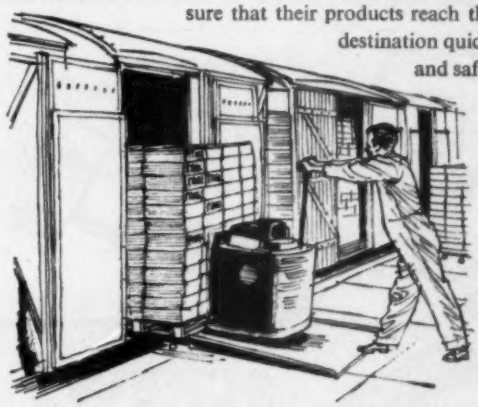

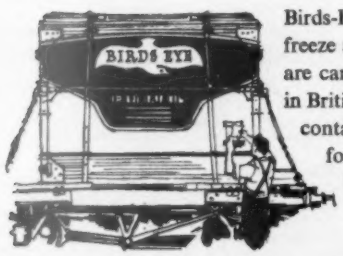

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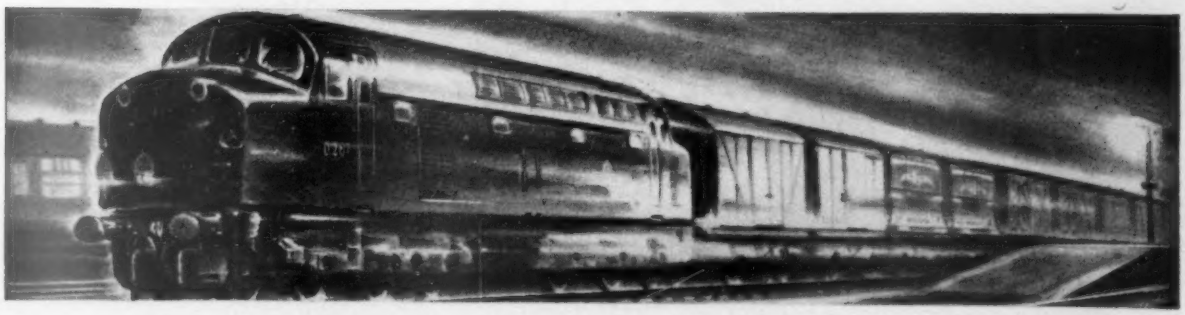

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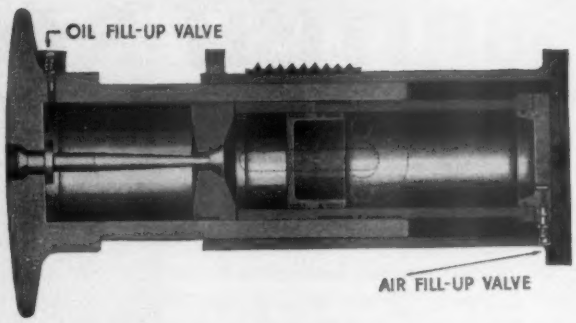

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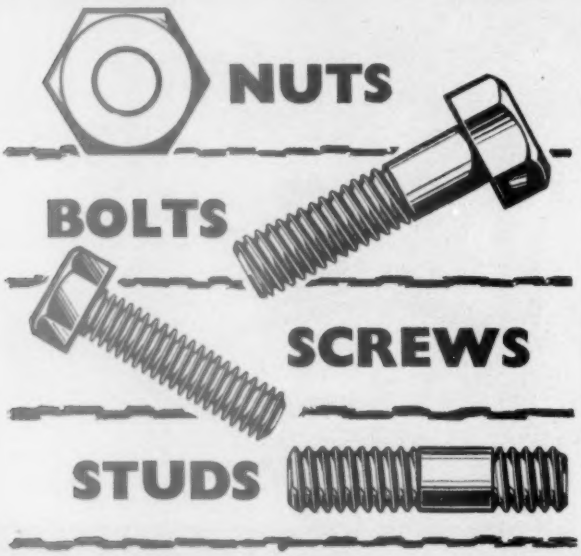

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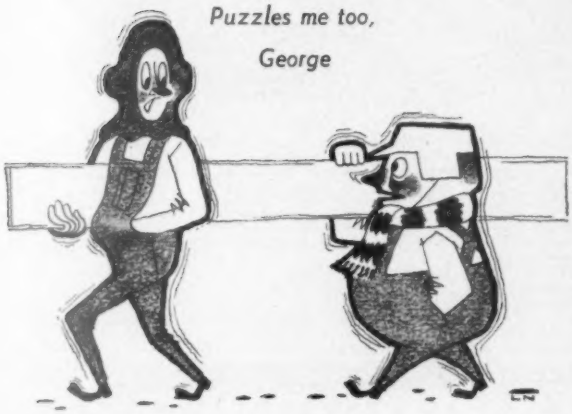

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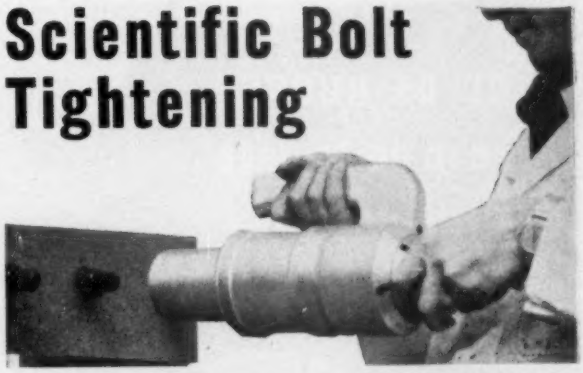

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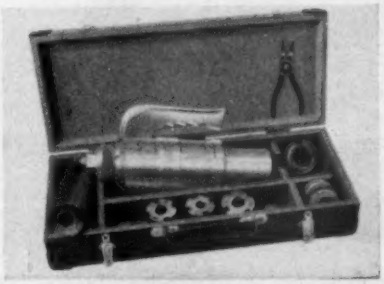

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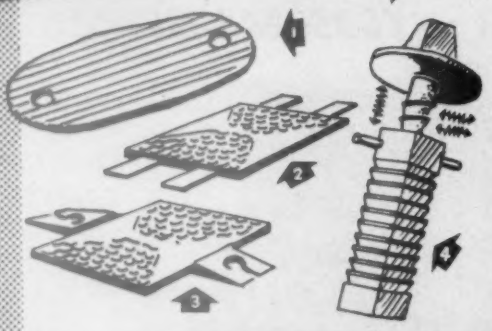

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Abingdon King Dick, Ltd. —
Abtus, Ltd. 8
Aircraft Marine Products (Gt. Britain), Ltd. ... —
Alfloc Water Treatment Service ... ... —
Alldays & Onions, Ltd. ... —
Allen, Edgar, & Co., Ltd. ... —
Allgemeine Elektricitats Gesellschaft ... ... —
Andre Rubber Co., Ltd. ... —
Archdale, James, & Co., Ltd. —
Armstrong Patents Co., Ltd. —
Asquith, Wm., Ltd. ... 28
Associated British Machine Tool Makers, Ltd. ... 33
Associated Electrical Industries-GRS, Ltd. ... —
Associated Electrical Industries (Manchester), Ltd.... 35
Associated Electrical Industries (Rugby), Ltd. ... —
Associated Electrical Industries (Woolwich), Ltd. ... —
Associated Lead Manufacturers, Ltd. 22
Atlas-Copco A/B ... ... —
Auster, Ltd. ... ... —
Austin Taylor Electrical, Ltd. ... ... —
Aviation Developments Ltd. —

Bagnall, W. G., Ltd. ... —
Baker, John, & Bessemer, Ltd. ... ... —
Bayliss, Jones & Bayliss, Ltd. —
Beckett, Laycock & Watkinson, Ltd. 43
Belships Co., Ltd., Skibs A/S —
Benjamin Electric Co., Ltd. —
B.E.N. Patents, Ltd. ... —
Berry, Henry, & Co., Ltd.... —
Beyer, Peacock & Co., Ltd. —
Beyer, Peacock (Hymek), Ltd. ... ... —
Beyer, Peacock, Railway Equipment, Ltd. ... —
B.F.M. Exhibition ... —
Bintex, Ltd. ... ... —
Birfield Industries, Ltd. ... —
Birkett, T. M., Billington & Newton, Ltd. ... ... —
Birmingham Railway Carriage & Wagon Co., Ltd. 41
Bolton Gate Co., Ltd. ... —
Bolton, Thos., & Sons, Ltd. —
Booth, James, Aluminium Ltd. ... ... —
Bowmaker (Plant), Ltd. ... —
Boydell, E., & Co., Ltd. ... —
B.P. Trading Co., Ltd. ... —
Bristol Siddeley Engines, Ltd. —
Britannia Batteries, Ltd. ... —
Britannia Iron & Steelworks, Ltd. ... ... —
British Electrical Repairs, Ltd. ... ... —
British Ermeto Corp., Ltd. —
British Insulated Callender's Cables, Ltd. ... ... —
British Insulated Callender's Construction Co., Ltd. ... —
British Oxygen Co., Ltd. ... —
British Paints, Ltd.... ... —
British Railways 37
British Timken, Division of The Timken Roller Bearing Company ... 1
British United Traction, Ltd. —
Bromsregulator Svenska Akt. —
Brown Bayley Steels, Ltd.... 15
Brown, David (Industries), Ltd. ... ... —
Brush Traction, Ltd. ... 6
B.T.R. Industries, Ltd. ... —
Bull, John, Rubber Co., Ltd. —
Bullers, Ltd. 23
Butler Machine Tool Co., Ltd. ... ... —

Caterpillar Tractor Co., Ltd. —
C.A.V., Ltd. ... ... —
Chapman, A. W., Ltd. ... —
Chipman Chemical Co., Ltd. —
Churchill Machine Tool Co., Ltd. ... ... —
Clayton-Wright, Howard, Ltd. ... ... —
Cleveland Bridge & Engineering Co., Ltd. ... ... —
Cleveland Meters, Ltd. ... —
Clyde Rubber Works Co., Ltd. 40
Cobra (Wood Treatment), Ltd. ... ... —
Cockerill, S. A., Ougree —
Colvilles, Ltd. ... ... —
Commonwealth Sales Corporation ... ... —
Consolidated Brake & Engineering Co., Ltd. —
Consolidated Pneumatic Tool Co., Ltd. ... ... —
Conveyancer Fork Trucks Ltd. ... ... —
Cooper, Geo., & Sons ... 40
Coventry Machine Tool Works, Ltd. ... ... —
Cowans, Sheldon & Co., Ltd. —
Craven Bros. (Manchester), Ltd. 21
Cravens Limited ... ... —
Crompton Parkinson, Ltd. —

Daimler Benz, A.G. ... —
Davey, Paxman & Co., Ltd. —
Davies & Metcalfe, Ltd. 26, 27
Dean, Smith & Grace, Ltd. 9
Docker Brothers ... ... —
Dorman Long (Africa) Ltd. —
Dragonair, Ltd. ... ... —
Drewry Car Co., Ltd. ... 5
Drummond Asquith Ltd. 28

Eagre Construction Co.,Ltd. —
Elastic Rail Spike Co., Ltd. —
English Electric Co., Ltd.... —
English Steel Corporation, Ltd. ... ... —
E.N.V. Engineering Co. Ltd. —
Ericssons Signalaktiebolag, L.M. ... ... —
Eutectic Welding Alloys Co., Ltd. ... ... —
Expanded Rubber Co., Ltd. —
Eyre Smelting Co., Ltd. ... —

Fairclough, Leonard, Ltd. 30
Falk, Stadelmann & Co., Ltd. —
Ferguson Battery Co., Ltd. —
Ferodo, Ltd. ... ... —
Fibreglass, Ltd. ... ... —
Finlay Engineering Ltd. ... —
Fisons Pest Controls, Ltd. 32
Flextol Engineering Co., Ltd. ... ... —
Fowler, John, & Co.(Leeds), Ltd. 44
French Railways ... ... —

General Electric Co., International ... ... —
General Electric Co., Ltd. —
General Motors Overseas Operations ... ... —
General Steel Castings Corporation ... ... —
Glacier Metal Co., Ltd. ... 20
Gloucester Railway Carriage & Wagon Co., Ltd. —
Godwin Warren (Engineering), Ltd.... ... ... —
Greenham Group ... ... —
Greenwood's & Airvac Ventilating Co., Ltd. ... 30
Gresham & Craven, Ltd.... 14
Grover & Co., Ltd. ... —
Guest, Keen & Nettlefolds (Midlands), Ltd. ... —

Hackbridge & Hewittic Electric Co., Ltd. ... —
Hackbridge Cable Co., Ltd. —
Hadfields, Ltd. ... ... —
Hale & Hale (Tipton), Ltd. —
Hallam, Sleigh & Cheston, Ltd. ... ... —
Hardy Spicer, Ltd. ... ... —
Harper, John, & Co., Ltd.... 25
Harvey, G. A., & Co. (London), Ltd. ... ... —
Hasler Telegraph Works, Ltd. ... ... —
Henderson & Keay, Ltd. ... —
Henschel Werke, G.m.b.H. 12
Heywood, S. H., & Co., Ltd. —
High Duty Alloys, Ltd. ... —
Hitachi, Ltd. ... ... —
Hoffmann Manufacturing Co., Ltd. ... ... —
Howard Pneumatic Engineering Co., Ltd. ... ... —
Hunslet Engine Co., Ltd. ... —
Hurtley, Fred, & Son, Ltd. —
Hyde, Robert, & Son, Ltd. —

Illingworth, E., & Co., Ltd. —
Imperial Aluminium Co., Ltd. ... ... —
Imperial Chemical Industries, Ltd. 18
Intermit, Ltd. ... ... —
International Twist Drill Co., Ltd. ... ... —
Isca Foundry, Ltd.... ... —
Isothermos, Société Internationale des Applications —

Jabroc Ltd. 34
Jackson Vibrators, Inc. ... —
Japan Rolling Stock Exporters' Assn. ... ... —

Kaye, Joseph, & Sons, Ltd. —
Kearns, H. W., & Co., Ltd. —
Kearsley, Robert, & Co. ... —
Kendall & Gent, Ltd. ... —
Kenitra Co., Ltd. ... ... —
King, George W., Ltd. ... —
Kisha Seizo Kaisha, Ltd. ... —
Kitchen & Wade, Ltd. ... 28
Klockner-Humboldt-Deutz, A.G. ... ... —
Knorr-Bremse, G.m.b. H. —
Krauss, Maffei A.G. ... —
Kretz, P. Ing., Dipl. ... —
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Lang, John, & Sons, Ltd. ... —
Lansing Bagnall, Ltd. ... —
Laycock Engineering, Ltd. —
Le Carbone (Great Britain), Ltd. ... ... —
Leeds Engineering & Hydraulic Co., Ltd.... ... 36
Levick, John, Ltd. ... ... —
Lockheed Precision Products Ltd. ... ... —
London Transport Executive —
Luwa, G.m.b.H. 29

Macdonald, John, & Co., (Pneumatic Tools), Ltd.... —
Marcroft Wagons, Ltd. ... 40
Marsden, Samuel, & Son, Ltd. 38
Marston Excelsior, Ltd. 18
Maschinenfabrik Augsburg-Nurnberg, A.G. ... ... —
Massey, B. & S., Ltd. ... —
Matisa Equipment, Ltd. ... —
Maus, J.M.J., Ltd. ... ... —
Metalastik, Ltd. ... ... —
Metallic Seamless Tube Co., Ltd. ... ... —
Metropolitan-Cammell Carriage & Wagon Co., Ltd. —
Mills, The Exors. of James, Ltd. 10, 11
Mirrlees, Bickerton & Day, Ltd. ... ... —
Mitsubishi Electric Mfg. Co. —
Mitsubishi Heavy Industries, Reorganised Ltd. ... —
Mitchell, Shackleton & Co., Ltd. ... ... —
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Neal, R. H., & Co., Ltd. ... —
Newton Bros. (Derby), Ltd. —
Nife Batteries, Ltd.... ... —
Nippon Signal Co., Ltd. ... —
North Bar Tool Co., Ltd. ... 39
North British Locomotive Co., Ltd. ... ... —
Nuts & Bolts (Darlaston), Ltd. ... ... —

Oldfield & Schofield Co., Ltd. ... ... —
Oleo, Pneumatics, Ltd. ... —
Ormerod Shapers, Ltd. ... —
Osborn, Samuel, & Co., Ltd. —
Ottermill Switchgear Ltd. ... —

P. & M. Co. (England), Ltd. —
Palnut Co., Ltd., The ... 36
Parkinson Cowan Industrial Products, Ltd. 39
Parkinson, J., & Son (Shipley), Ltd. ... ... —
Paterson Hughes Engineering Co., Ltd. ... ... —
Pearson Machine Tool Co., Ltd. ... ... —
Pel, Ltd. ... ... —
Permali, Ltd. 34
Peters, G. D., & Co., Ltd.... —
Pirelli-General Cable Works, Ltd. ... ... —
Planwell Engineering Co., Ltd. ... ... —
Powell Duffryn Engineering Co., Ltd. 17
Preformed Line Products (Gt. Britain), Ltd. ... —
Pressed Steel Co., Ltd. ... —
Provident Mutual Life Assurance Association ... —

Railko, Ltd. ... ... —
Railway Signal Co., Ltd. ... —
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Setright Registers, Ltd. ... —
Sheffield Twist Drill & Steel Co., Ltd. ... ... —
Siebe Gorman & Co., Ltd. —
Siemens & General Electric Railway Signal Co., Ltd. 24
Siemens & Halske, Akt. ... 19
Silentbloc, Ltd. ... ... —
Simmonds Aerocessories, Ltd. ... ... —
Simmonds & Stokes (Niphan), Ltd. ... ... —
Skefko Ball Bearing Co., Ltd. 2
Smith's Industrial Instruments, Ltd. ... ... —
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Standard Telephones & Cables, Ltd. ... ... —
Steel Coy. of Wales, Ltd. ... —
Steel, Peech & Tozer ... —
Steels Engineering Products, Ltd. 7
Stirk, John, & Sons, Ltd. ... —
Stone, J., & Co. (Deptford), Ltd. ... ... —
Stream Line Filters, Ltd. ... 13
Suffolk Iron Foundry (1920), Ltd. 41
Sulzer Bros. (London), Ltd. —
Summerson, Thos., & Sons, Ltd. ... ... —
Superheater Co., Ltd. ... —
Swift, George & Sons, Ltd. —
Swiss Industrial Company ... —
Swiss Locomotive & Machine Works ... ... —
Sylglas Company, The ... —

Talbot Waggonfabrik ... —
Tangyes, Ltd. ... ... —
Taylor Bros. & Co., Ltd. ... 3
Taylor Bros. (Sandiacre), Ltd. ... ... —
Taylor, F. & Sons (Manchester) Ltd. ... ... —
Taylor Rustless Fittings Co., Ltd. ... ... —
Tearne & Sons, Ltd. ... —
Tees Side Bridge & Engineering Works, Ltd. ... —
Telephone Manufacturing Co., Ltd. 31
Thermit Welding (Gt. Britain) Ltd. ... ... —
Thomas, Richard, & Baldwins, Ltd. ... ... —
Thomson, Thomas, Sons & Co. (Barrhead), Ltd. ... —
Toledo Woodhead (Sheffield), Ltd. ... ... —
Town, Fredk., & Sons, Ltd. —
Transport Brakes, Ltd. ... —
Transport Engineering & Equipment, Ltd. ... —
Trico-Folberth, Ltd. ... —
Tulloch, Ltd. ... ... —
Turton, Geo., Platts & Co., Ltd. 38
Turton, Thos. & Sons, Ltd. —
Tyer & Co., Ltd. ... ... —

United Coke & Chemicals Co., Ltd. ... ... —
United Steel Companies, Ltd. —

Vacuum Brake Co., Ltd. ... —
Vokes, Ltd. ... ... —
Vulcanised Fibre, Ltd. ... —

Walker, James, & Co., Ltd. 16
Ward, H. W., & Co., Ltd. ... 33
Ward, Thos. W., Ltd. ... 40
Werkspoor, N.V. ... ... —
Westinghouse Brake & Signal Co., Ltd. 4
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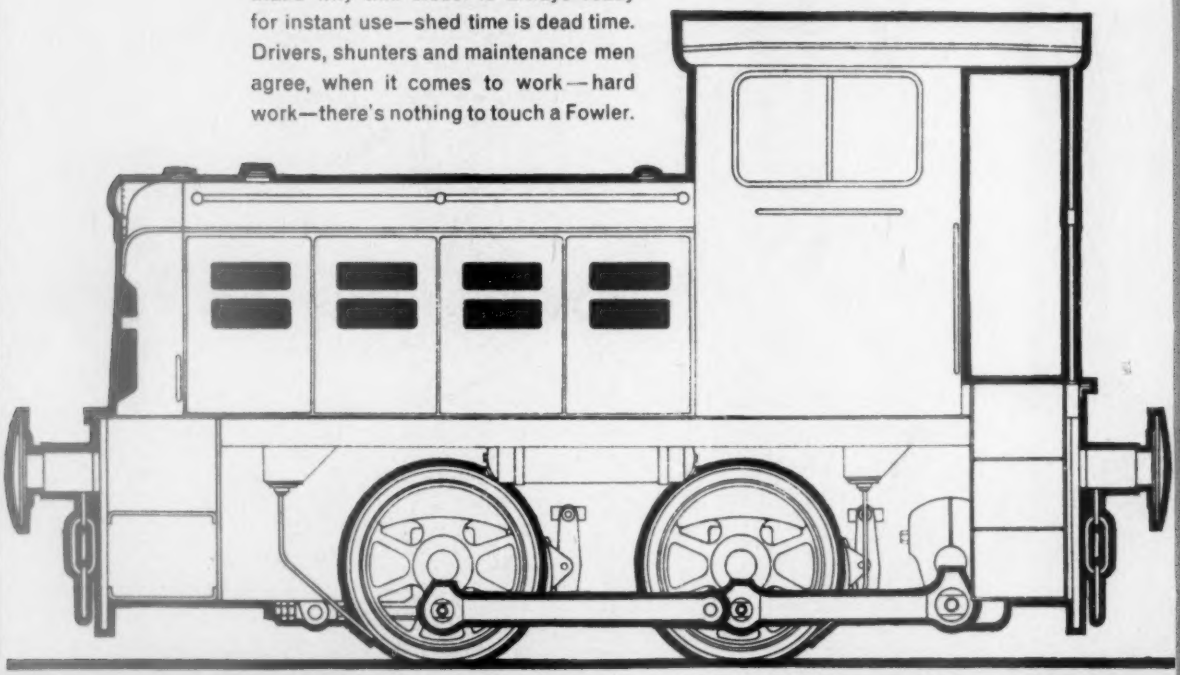

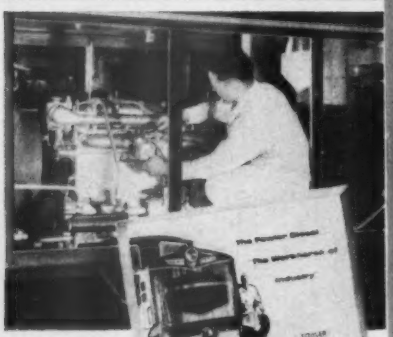

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